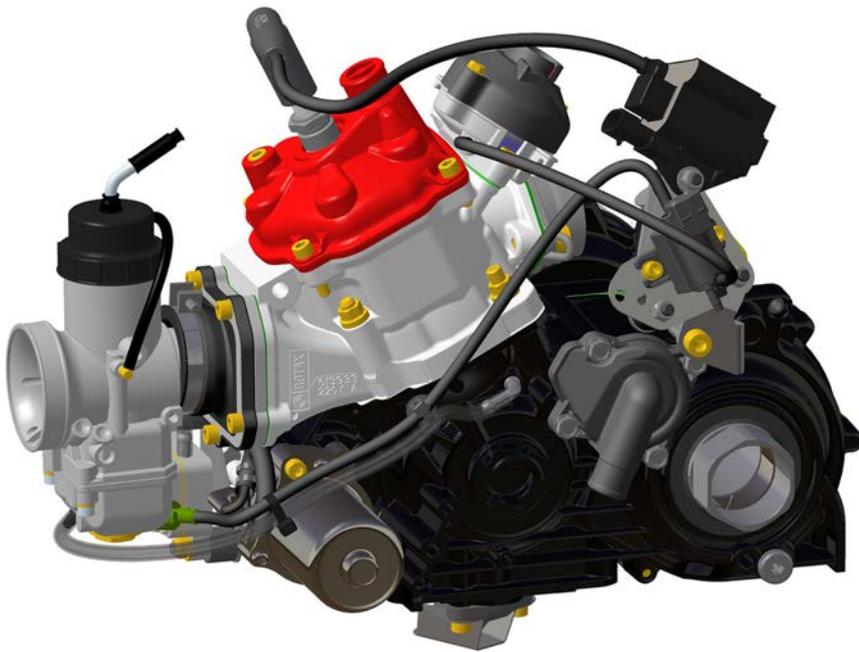


**ROTAX**<sup>®</sup>  
KARTING



# Installation instructions and Operator's Manual



*for ROTAX<sup>®</sup>-engines type*

## **125 MAX DD2 evo**

Part no.: 297733

Edition: 09/2016

## General information

BRP-Rotax recommends products of the following companies:



For information regarding the repair of the engine 125 MAX DD2 evo contact an authorized service center or consult the workshop manual (available on the internet at [www.rotax-kart.com](http://www.rotax-kart.com)).

**We ask to hand over this manual, the engine identity card and the product and service registration document to the new owner in case of a change of ownership.**

## **Preface**

This document and all technical data and procedures therein are property of BRP-Rotax GmbH & Co KG and based on the state of knowledge at the time of publication. The manual has been drawn up to the best of our knowledge. However, we exclude any liability.

We reserve all rights including technical modification and possibility of errors.

Reprinting, translation or copies in whole or in part, are authorized only after written permission by BRP-Rotax GmbH & Co KG.

BRP-Rotax GmbH & Co KG reserves the right at any time to discontinue or change specifications, prices, designs, features, models or equipment without incurring any obligations.

Engine performance may vary depending on, among other things, general conditions, ambient temperature and altitude.

## Introduction

Congratulations on choosing the ROTAX engine Type 125 MAX DD2 evo.

The ROTAX engine Type 125 MAX DD2 evo has been developed exclusively for the use in go-karts, which must only be run on specified tracks. This product has numerous technical innovations.

**▲ Warning:** Before starting with installation and operation of the engine, observe the installation instructions and Operator's Manual and follow all instructions.

**▲ Warning:** This engine performs better than comparable products.

## Repeating symbols

**▲ Warning:** Identifies an instruction, which if not followed may cause injury or endanger the life of the driver, mechanic or third party.

**■ Attention:** Denotes an instruction which if not followed may severely damage the engine. Non-compliance might lead to health hazards under certain conditions.

**◆ Note:** Information useful for better execution and understanding of instructions.

**➔** Denotes a working operation

**✓** Denotes a checking operation

**TIP** This information gives you additional advice and tips

End of section:

---

End of chapter:

---

---

**INSTALLATION INSTRUCTIONS FOR ROTAX ENGINE TYPE  
125 MAX DD2 evo**

## ***Table of Contents of Installation Instructions***

<b>1. General.....</b>	<b>6</b>
<b>2. Installation and connection of the fuel system.....</b>	<b>7</b>
2.1. Installation and connection of the fuel pump.....	7
<b>3. Installation and connection of the carburetor.....</b>	<b>9</b>
<b>4. Installation of the Bowden cable for carburetor control.....</b>	<b>10</b>
<b>5. Installation of the mounting plate.....</b>	<b>12</b>
<b>6. Fitting of the spark plug.....</b>	<b>13</b>
<b>7. Installation and connection of the RAVE control unit.....</b>	<b>14</b>
<b>8. Check of oil level in gear box.....</b>	<b>17</b>
<b>9. Installation of overload clutch and engine with rear axle.....</b>	<b>19</b>
<b>10. Engine attachment to chassis.....</b>	<b>20</b>
10.1. Engine attachment with engine brackets.....	20
10.2. Direct attachment of the engine to chassis.....	21
<b>11. Installation of the wiring harness.....</b>	<b>22</b>
<b>12. Installation of the battery and ECU.....</b>	<b>26</b>
12.1. Install ECU into the battery holder.....	26
12.2. Installation of the battery.....	28
<b>13. Assembly of paddle shift system.....</b>	<b>30</b>
<b>14. Installation of the radiator.....</b>	<b>36</b>
<b>15. Installation of the intake silencer with integrated air filter.....</b>	<b>38</b>
<b>16. Installation of the exhaust system.....</b>	<b>39</b>
<b>17. Finishing work.....</b>	<b>41</b>
17.1. Venting of the gear box.....	41

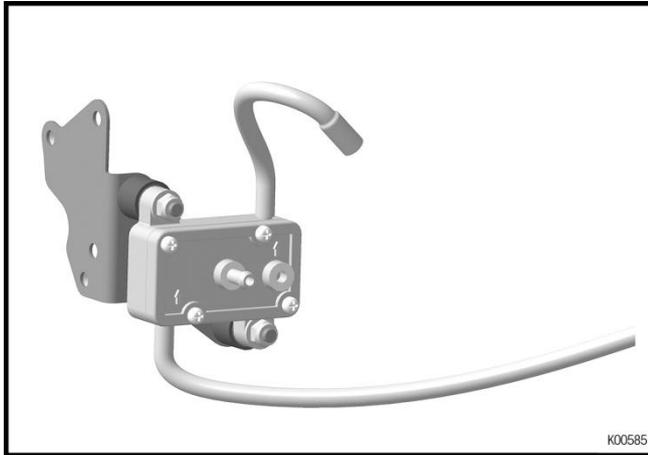
## 1. General

- ▲ **Warning:** For the best possible engine operation, compliance with the following advice regarding installation of engine and equipment is required.
  - ▲ **Warning:** Engine operation is permitted only with equipment supplied by ROTAX.
  - ▲ **Warning:** Modifications to engine or equipment are not allowed.
  - ▲ **Warning:** Besides the engine-specific installation advice, also pay attention to information of the respective chassis manufacturer.
  
  - ◆ **Note:** The registration document and engine identity card must be provided to the final consumer upon delivery by the authorized service center with handover date and company stamp.
  - ◆ **Note:** The data entered in the registration document and/or engine identity card is required for the verification of a warranty claim. Without a completely filled-in engine identity card, no warranty claim will be granted.
  - ◆ **Note:** In case of participating in the ROTAX MAX CHALLENGE (RMC), the engine must be verified for conformity with the technical regulations and sealed. The serial number of the seal must be entered in the engine identity card.
- 
-

## 2. Installation and connection of the fuel system

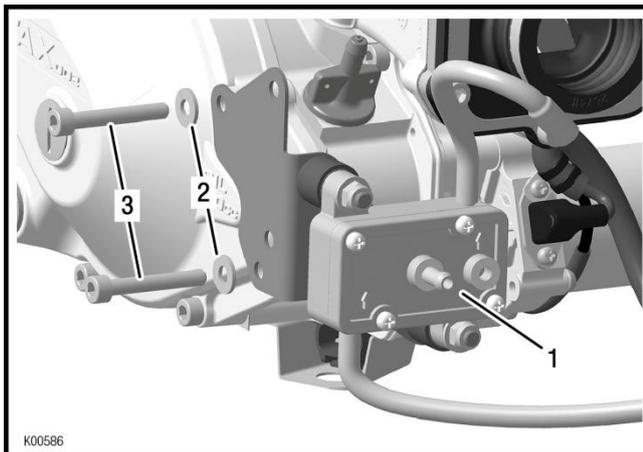
### 2.1. Installation and connection of the fuel pump

- ➔ The retaining plate, rubber buffers, fuel pump and fuel hose (with 230 mm and 1800 mm length) are already pre-assembled. See *Fig. 1*.



*Fig. 1*

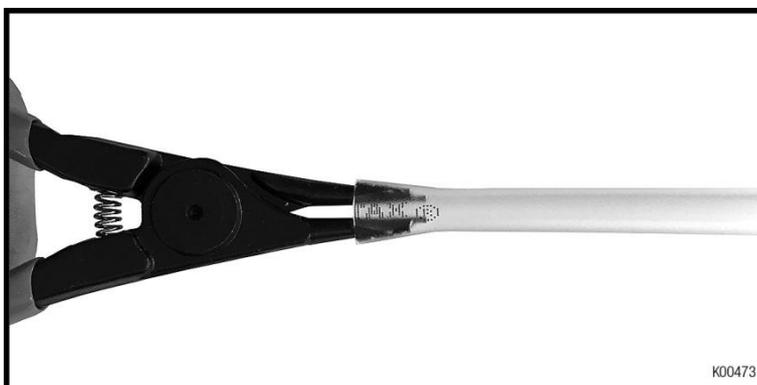
- ➔ Install the retaining plate with the fuel pump (pos. 1) on the gearbox cover by using 2 screws M6x30 (pos. 3) and washers (pos. 2).



*Fig. 2*

**TIP:** Facilitate the assembly of the fuel hose by slightly widening the hose end with a pair of circlip pliers.

■ **Attention:** Fuel hose can be damaged! Avoid excessive widening of the fuel hose.



*Fig. 3*

- ➔ The fuel hose with 230 mm length will be connected later to the carburetor, see carburetor installation in section 3.

- ➔ The larger fuel hose (pos. 1) should be connected to the fuel filter (pos. 2) and to the fuel tank. See Fig. 4.

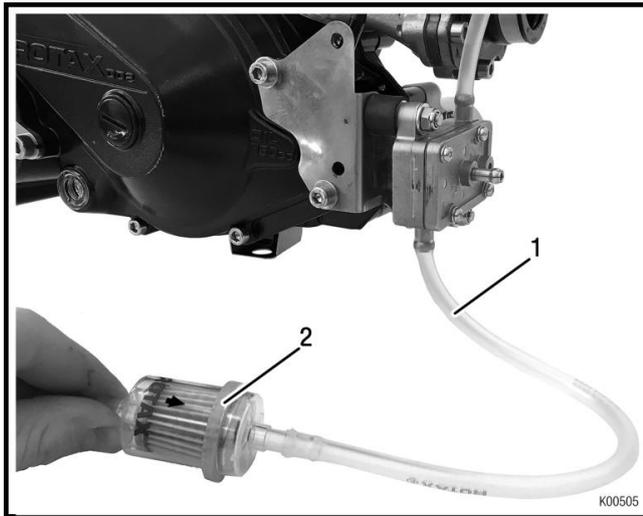


Fig. 4

- **Attention:** Pay attention to the arrow's direction on the fuel filter. This must point towards the fuel pump.
- **Attention:** Route the fuel line from the fuel tank to the fuel filter so that it does not touch any moving parts or the track and attach the fuel line onto the top side of the chassis tube.
- **Attention:** The flow in the impulse hose and fuel lines must not be restricted by the use of cable ties.

### 3. Installation and connection of the carburetor

See Fig. 5.

- ➔ Fit the carburetor (pos. 1) into the carburetor socket and secure with a hose clamp (pos. 2) in vertical position.
- ➔ Connect the outlet hose of the fuel pump with the fuel inlet (pos. 3) on the carburetor.

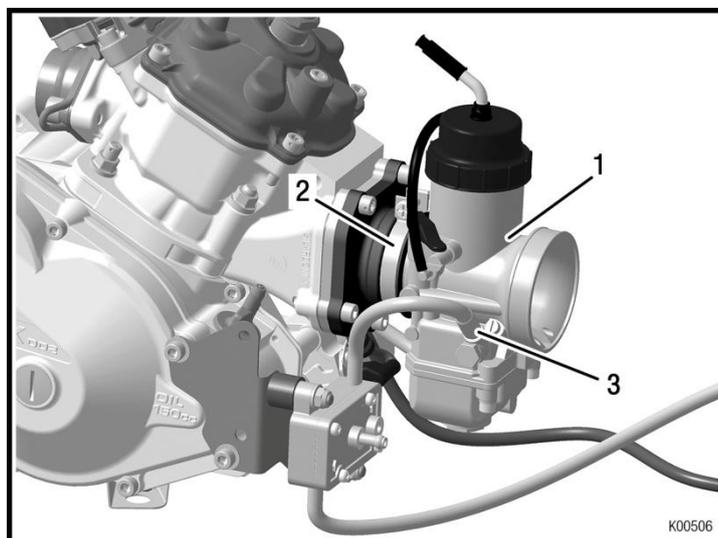


Fig. 5

#### 4. Installation of the Bowden cable for carburetor control

See Fig. 6.

- ➔ Carefully remove the carburetor cover and the rubber ring (pos. 7, 8).
- **Attention:** Reset spring (pos. 6) of carb piston presses against carburetor cover and might eject carburetor cover at removal.
- ➔ Remove nipple screw (pos. 5) with A/F 10 wrench from carburetor piston (pos. 2).
- ➔ Engage nipple of Bowden wire (pos. 9) in nipple screw (pos. 5).
- ➔ Fit nipple screw in carburetor piston and hand-tighten with A/F 10 wrench.
- ➔ Insert carburetor piston (pos. 2) into carb body with recess of piston towards intake silencer.
- ➔ Pass Bowden wire through compression spring (pos. 6) and through cover with rubber ring (pos. 7, 8) of carburetor.
- ➔ Fit carb cover (pos. 7) on carburetor.
- ➔ Pass Bowden wire through Bowden conduit and through adjustment screw on chassis (throttle pedal).
- ➔ Connect Bowden cable to throttle pedal.

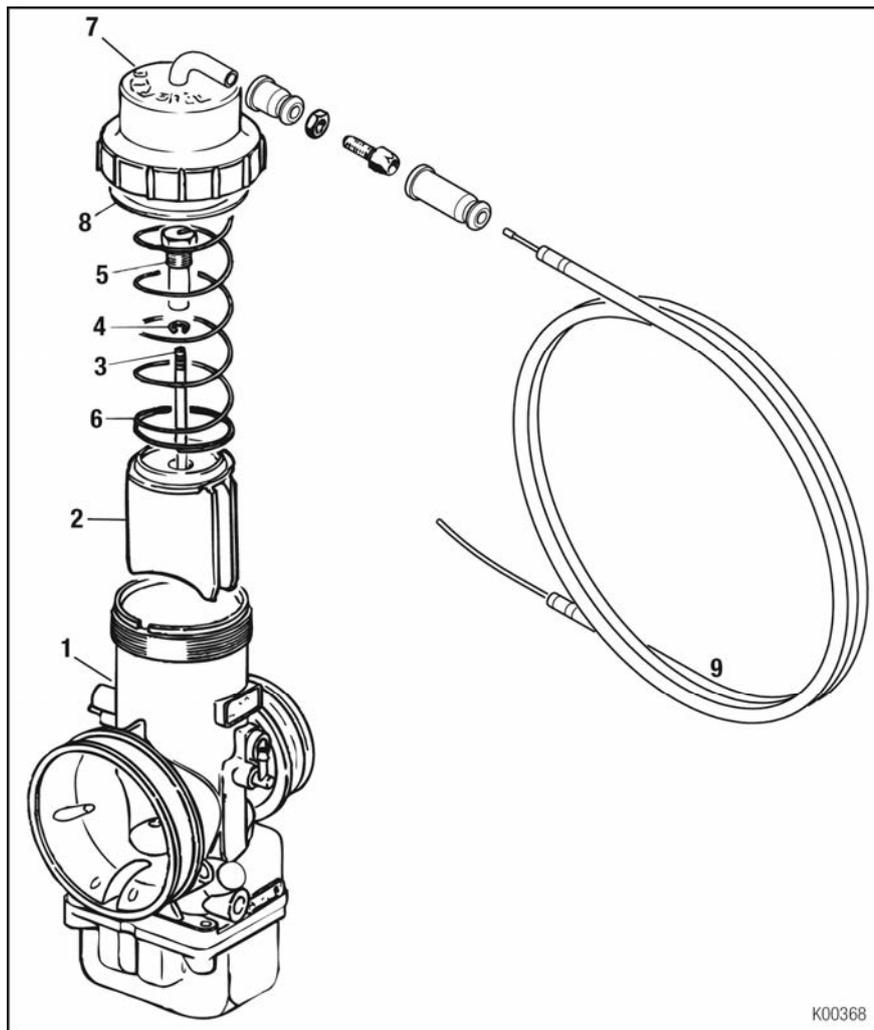


Fig. 6

◆ **Note:** Shorten Bowden cable as required.

- ➔ Route the carburetor Bowden cable on the top side of the chassis tubes and attach with the cable ties supplied. Make sure that the Bowden cable does not touch any moving parts or the track.
  - ▲ **Warning: The carburetor Bowden cable must not be kinked or restricted as the carburetor piston might get stuck in full throttle position.**
  - ➔ Set and secure the adjustment screw for Bowden cable on chassis so that the carburetor piston will remain in closed position when throttle pedal is not activated.
  - ➔ Set and secure the stop screw for throttle pedal so that, with pedal completely pressed down, the carburetor piston will be in fully open position. The Bowden cable must not be under full tension when the throttle is in fully open position.
- 
-

## 5. Installation of the mounting plate

- ➔ The holding bracket, the mounting plate, the solenoid valve and the ignition coil are already pre-assembled.
- ➔ Install whole bracket kit with Allen screw M8x50 (pos. 2) and distance sleeve 8.2/12/25.5 (pos. 3) onto the engine.

■ **Attention:** Slot (pos. 1) of retaining plate has to be installed in the correct position.

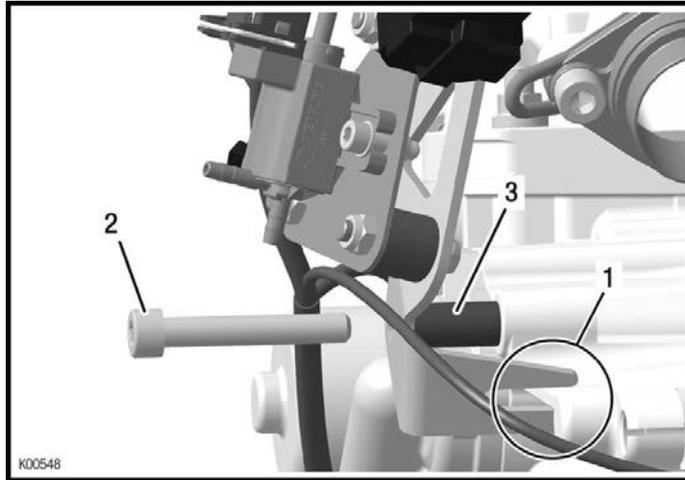


Fig. 7

- ◆ **Note:** Distance sleeve (pos. 3) has to be installed between engine housing and retaining plate. Distance sleeve can be replaced by the fitting of an additional seat stay.

## 6. Fitting of the spark plug

See Fig. 8

The engine will be supplied with a spark plug of the type NGK Iridium.

- ➔ Remove the transport plug from the cylinder head.
- ➔ Check electrode gap of spark plug. Adjust as required.
- ◆ **Note:** The electrode gap of the spark plug should be 0,7 mm (0.027 in) to 0,8 mm wide (0.032 in) (for NGK spark plugs). Only slight bending of the ground electrode is permitted.
- ➔ Fit supplied spark plug (pos. 1) and tighten 25 Nm (221 lbf in) to 27 Nm (239 lbf in).
- ➔ Install the spark plug connector (pos. 2), ensure correct engagement.

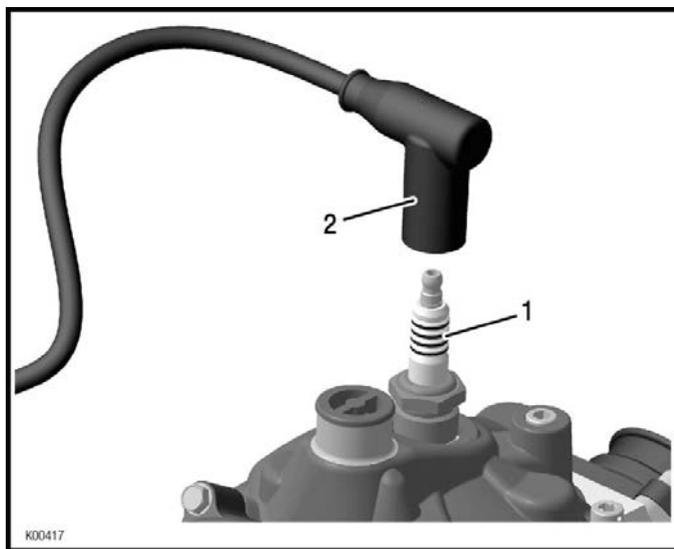


Fig. 8

## 7. Installation and connection of the RAVE control unit

◆ **Note:** The hose package of the RAVE control is already pre-assembled.

◆ **Note:** The impulse restrictor is offered optionally.

Insert impulse nozzle (pos. 6) about 25 mm into the 420 mm pressure line (pos. 7) using an Allen key SW4. Pay attention to the mounting direction! It also works without an impulse nozzle, this only serves to choke the opening of the exhaust valve.

◆ **Note:** In order to prevent the displacement of the impulse nozzle (pos. 6), a small cable tie (pos. 8) should be attached directly afterwards to the pressure line. Do not tie up the pressure line completely!

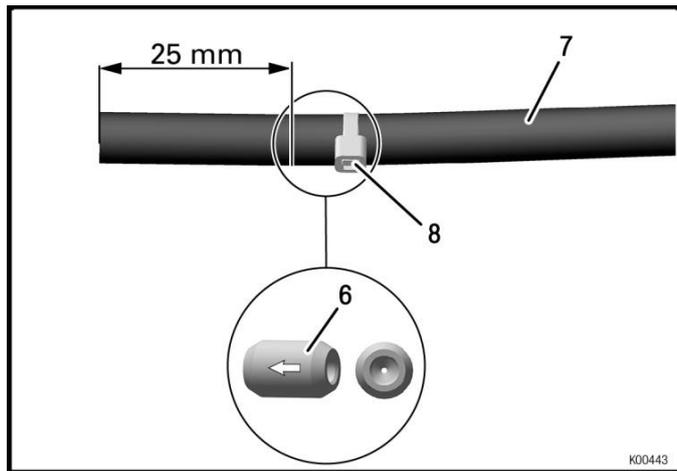


Fig. 9

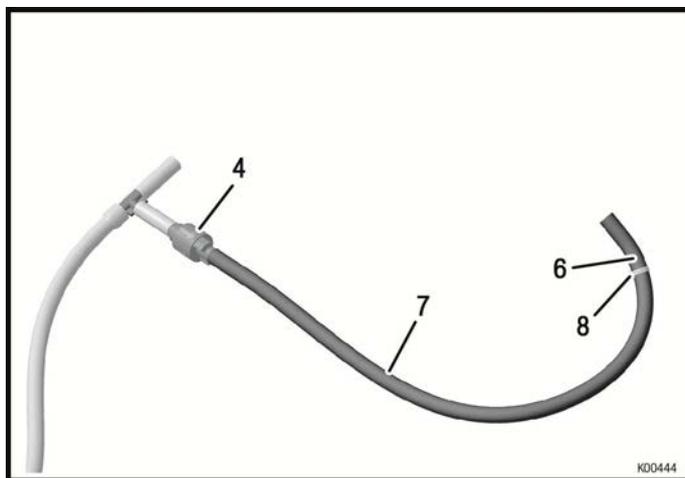


Fig. 10

➔ Attach the black hose of the hose package (pos. 1) to the metal connector (pos. 2) of the magnetic valve.

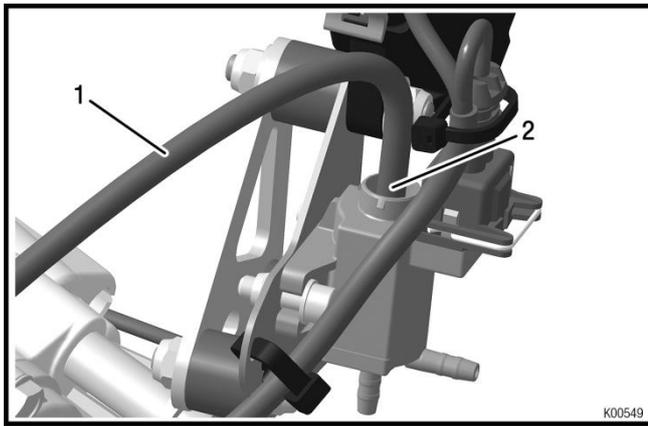


Fig. 11

- ➔ Attach the other end of the hose package (pos. 1) (short end with T-piece) to the fuel pump.

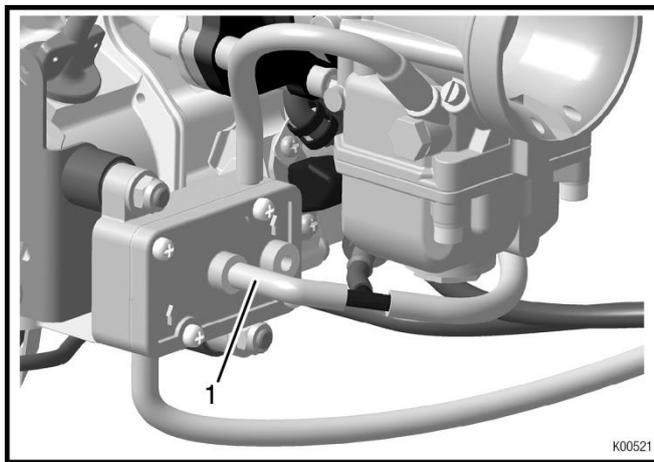


Fig. 12

- ➔ Attach the fuel line of the hose package (pos. 1) to the impulse nipple on the engine housing.

◆ **Note:** Check that valve is not the lowest point of the impulse circuit to prevent that condensation affects a proper operation.

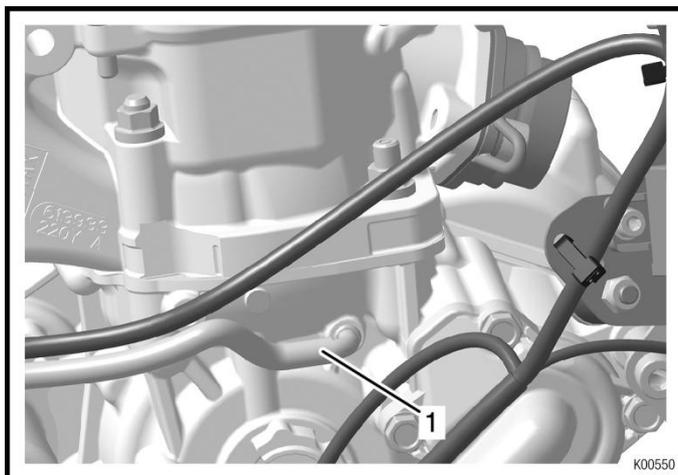


Fig. 13

- ➔ Attach cable tie wrap with mount (pos. 1) to the housing. See Fig. 14.

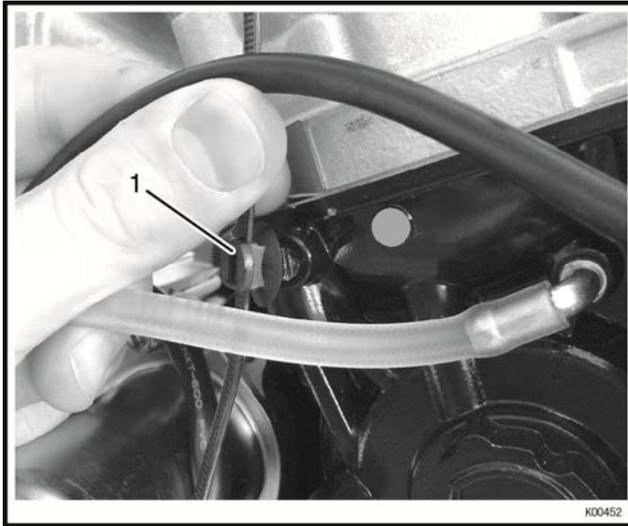


Fig. 14

- ➔ Secure both lines with a cable tie, ensuring that the black hose (pos. 2) is on top. See Fig. 15.

■ **Attention:** Do not tighten cable ties too tight, because constricted lines can lead to loss of function.

- ➔ Attach an additional cable tie (pos. 3) as shown in Fig. 15

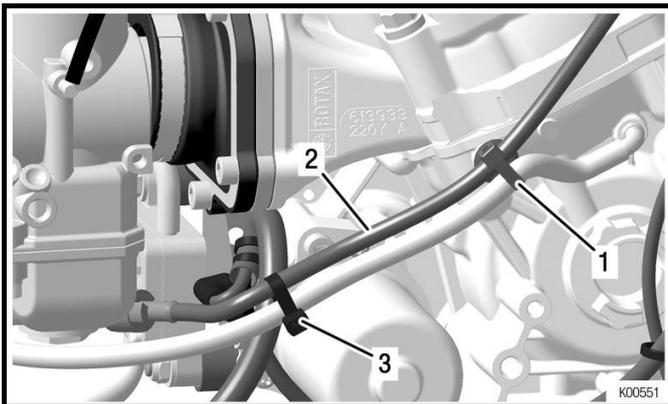


Fig. 15

- ➔ Attach the 220 mm pressure line (pos. 1) to the magnetic valve (pos. 3). Secure the pressure line on the magnetic valve with a tie wrap (pos. 4). Attach the other end of the pressure line to the exhaust valve (pos. 2).

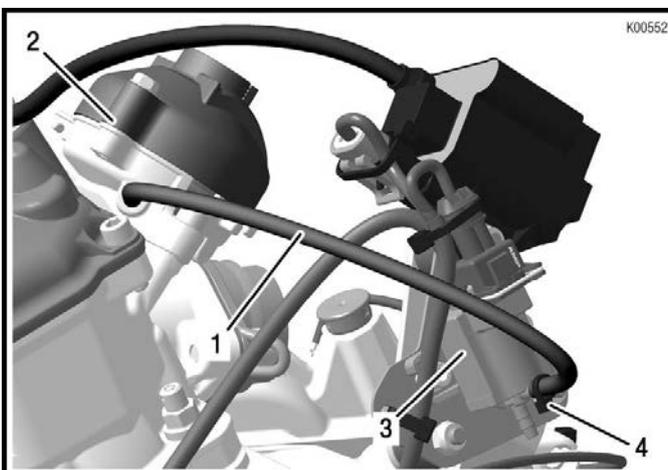


Fig. 16

## 8. Check oil level in gear box

The gear box is already filled with the appropriate amount of oil 150 cc (0.039 gal.) by the engine manufacturer. However, before the engine is installed in the frame, the oil level must be verified or replenished.

- ➔ Place engine on a horizontal surface and/or assembling trestle.
- **Attention:** When placing the engine on a horizontal surface, take care not to damage the crankcase sensor, which is mounted on the bottom of the crank case.
- ➔ The oil level can be checked on the inspection glass (pos. 1). It should reach approximately to one third of the inspection glass, see *Fig. 32*. If the oil level is not sufficient, replenish oil as described in the following steps.

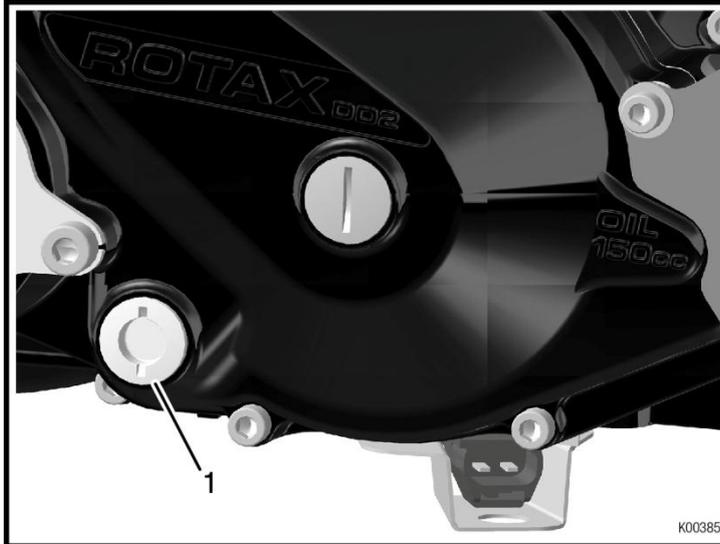


Fig. 32

- ◆ **Note:** Oil capacity (total): 150 cc (0.039 gal)
- ◆ **Note:** Specification of gear oil: engine oil SAE 15W-40.
- ➔ Remove the air vent screw (pos. 1, *Fig. 33*) and slowly fill in oil of specification SAE 15W-40 until oil level is in the middle of the inspection glass.
- ➔ Hand-tighten air vent screw (pos. 1).

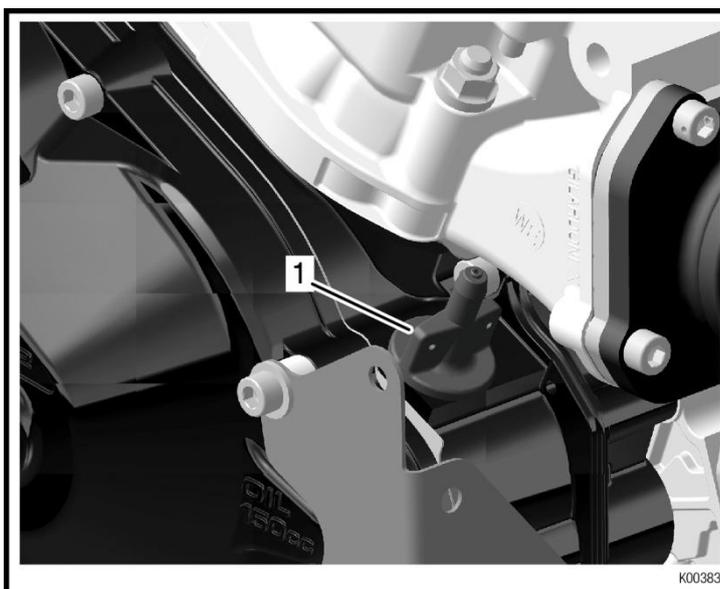


Fig. 33

- ◆ **Note:** For draining the oil from the gear case, remove the magnetic oil drain plug (pos. 1) and sealing ring (pos. 2). Clean the oil drain plug before installation. Always use a new sealing ring.

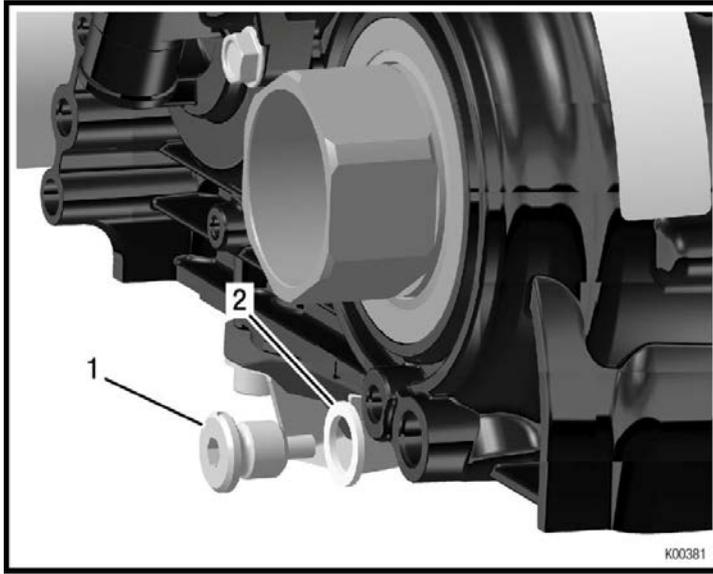


Fig. 34

- ◆ **Note:** Tighten magnetic oil drain plug (pos. 1) to 20 Nm (177 lbf.in.).
  - ▲ **Warning:** Do not run the engine without gear oil. This will lead to engine failure.
-

## 9. Installation of overload clutch and engine with rear axle

- ◆ **Note:** The overload clutch is the link between the engine and the rear axle of the kart. In case that the rear axle has been blocked by (e.g. braking), the overload clutch is slipping slightly and is not transferring the peak load from the rear axle to the engine.

The bushings (pos. 2) are inside the overload clutch (pos. 1).

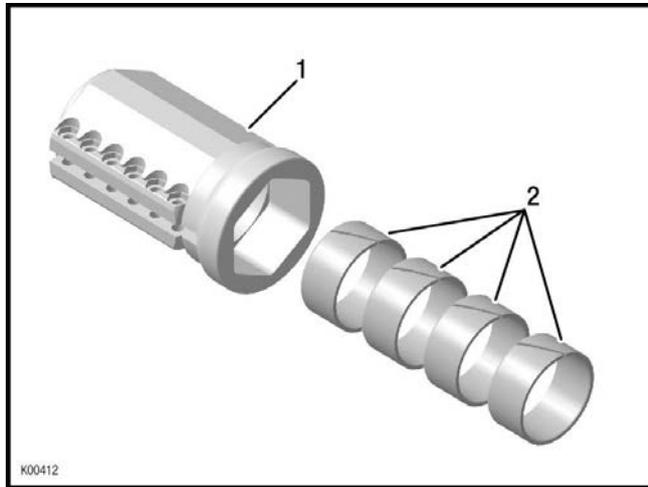


Fig. 35

- ➔ Slide the clamp ring (pos. 1), Fig. 36, the thrust washer (pos. 2), Fig. 36 and the overload clutch (3) to the middle of the rear axle.

- ◆ **Note:** The rear axle of the kart must have a smooth surface (no grooves for keys) in the area of the 4 bushings of the overload clutch.

- ◆ **Note:** Do not tighten the overload clutch and clamp ring yet (see section 10.1 Engine attachment with engine brackets).

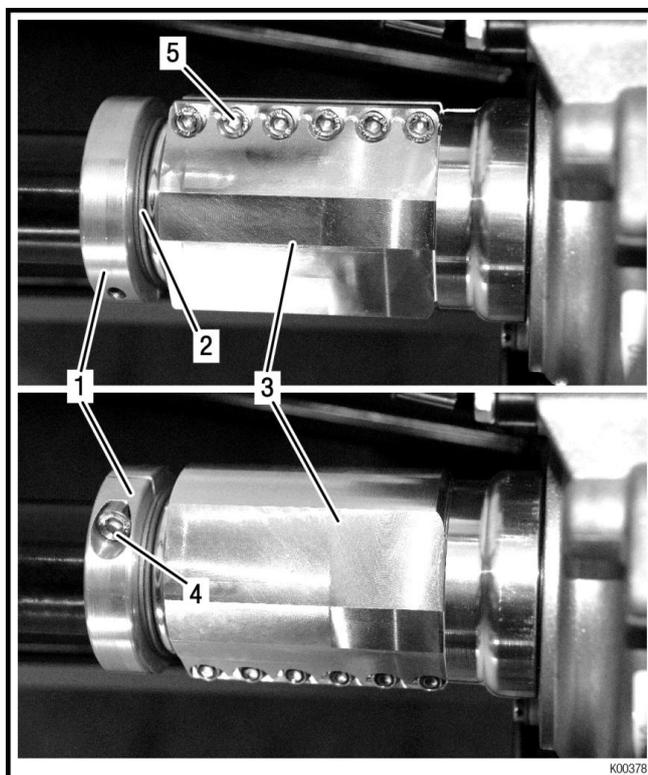


Fig. 36

## 10. Engine attachment to chassis

### 10.1. Engine attachment with engine brackets

See *Fig. 37* and *Fig. 38*.

The engine has to be fixed to the chassis by means of 2 engine brackets (pos. 1) (*Fig. 36*). Due to different distances of the 2 main rails of various chassis brands, the engine bracket is not included in the scope of supply.

◆ **Note:** The 125 DD2 engine can only be mounted on specially prepared chassis for this engine type.

▲ **Warning:** For engine attachment to the chassis, please follow the instruction of the chassis manufacturer.

◆ **Note:** Engine alignment is achieved by measuring the distance between front and rear axle.

➔ After engine alignment, tighten the 4 Allen screws M8 x 25 to fix the upper engine bracket to the engine with 28 Nm (248 lbf.in.). Fix and tighten the lower engine bracket to the upper bracket with 4 Allen screws M8 x 30 with 22 Nm (195 lbf.in.). See *Fig. 36*.

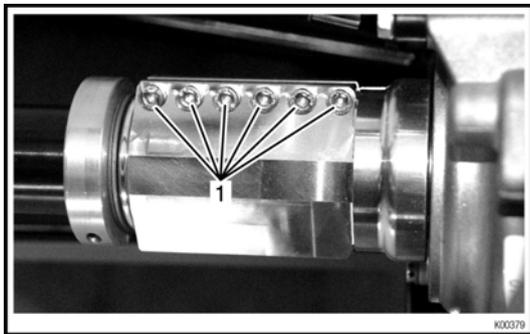
◆ **Note:** Secure the Allen screws with LOCTITE 243 blue.

◆ **Note:** The minimum screw in length for the gear case must be between 16 mm and 20 mm.

➔ Slide the overload clutch, thrust washer and clamp ring along the axle to the hollow shaft and then fix to the rear axle. See *Fig. 36*.

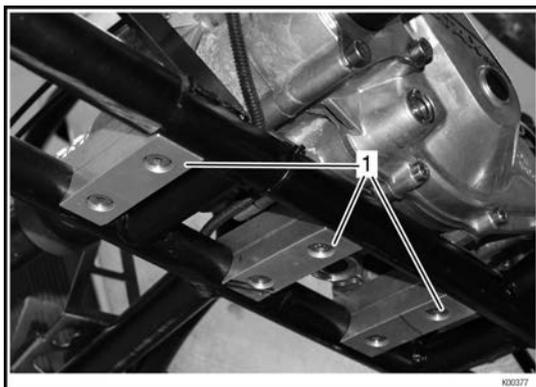
➔ Tighten the 6 Allen screws (pos. 1, *Fig. 37*) or (pos. 5, *Fig. 36*) on the overload clutch with 7 - 8 Nm (62 - 71 lbf.in.).

◆ **Note:** Tightening sequence is from the outer to the inner screws.



*Fig. 37*

▲ **Warning:** For engine attachment to the chassis, please follow the instructions of the chassis manufacturer.



*Fig. 38*

FIGURE SIMILAR

## 10.2. Direct attachment of the engine to chassis

If the frame of the chassis is specially prepared for installation of the Rotax 125 MAX DD2 evo, then 2 sheet metal brackets with holes are welded onto the two frame tubes. The engine is clamped between the two brackets with 4 bolts.

- ◆ **Note:** Thread length in crankcase should be between 16 – 24 mm (0.6 – 0.95 in).
- ◆ **Note:** Secure bolts with bolt adhesive e.g. LOCTITE 243.
- ➔ Mount engine directly on the brackets.
- ◆ **Note:** Check for easy access to the crankshaft sensor (pos. 1). There are two options to install the pick-up sensor. Choose the orientation which gives you the best fit for your chassis installation. See *Fig. 39*
- ▲ **Warning:** For engine attachment to the chassis, please follow the instructions of the chassis manufacturer.

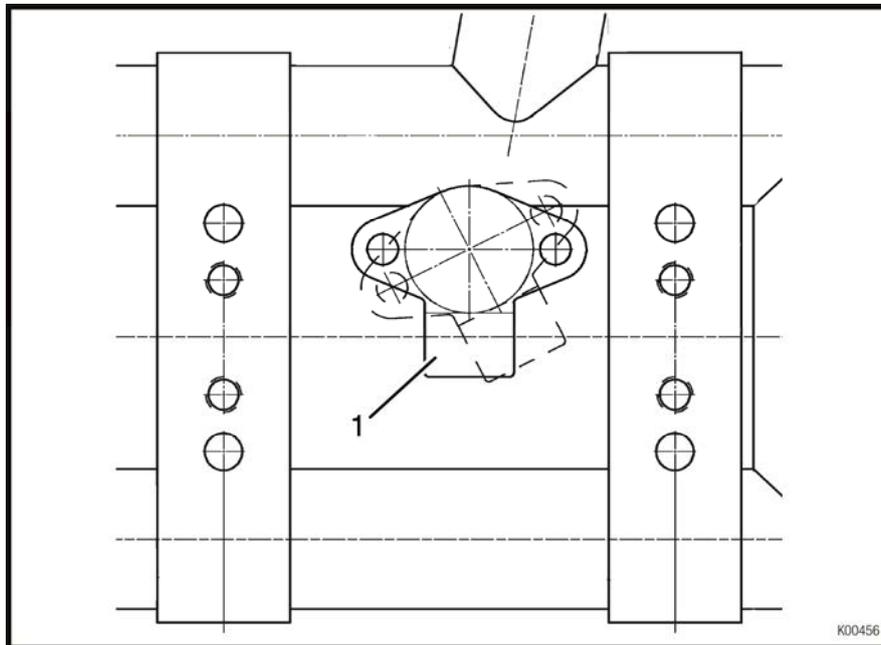


Fig. 39

## 11. Installation of the wiring harness

The wiring harness is delivered partly pre-assembled to facilitate the installation. This means that the relay, the master switch and the battery cover are already pre-assembled and wired.

- ◆ **Note:** The connector assignment is shown on the following pages. Details on the assignment of cables and pins are given in the wiring diagram.
- ◆ **Note:** Cable lugs may break after repeated bending.
- ➔ Place the wiring harness loosely on the chassis.
- ◆ **Note:** Always start the installation at the engine side to work without tension on the wiring harness.
- **Attention:** Strain relief of the plug connections must be ensured.
- ◆ **Note:** Compensate excessive length of wiring harness by routing cables in loops.
- ▲ **Warning:** The wiring harness must not touch moving parts or the track.
- ◆ **Note:** When unplugging connections on ignition pick up and ignition coil, press the integrated catch first.
- ◆ **Note:** Disconnect any electrical plug connection only by pulling against the plugs.
- ➔ Pre-mount the large cable tie through the two holes provided on the mounting plate. See Fig. 17.

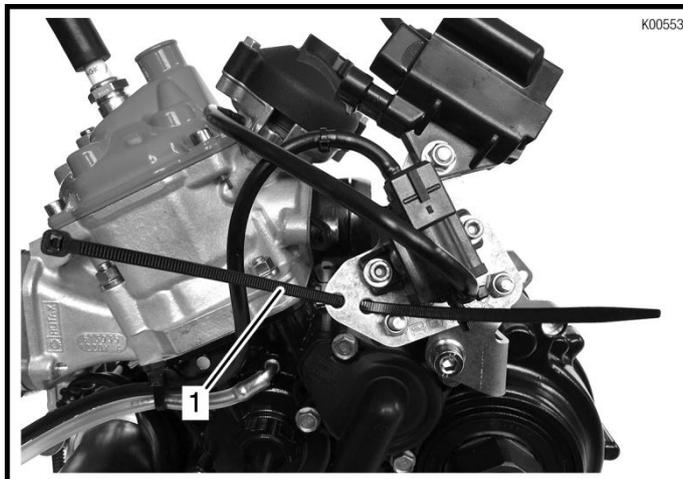


Fig. 17

- ➔ Connect solenoid valve (pos. 1) and ignition coil (pos. 2). Attach both connectors (signed green) (pos. 3) to the two components. See Fig. 18.
- ➔ Fasten cables with cable ties (pos. 4) on the mounting plate.

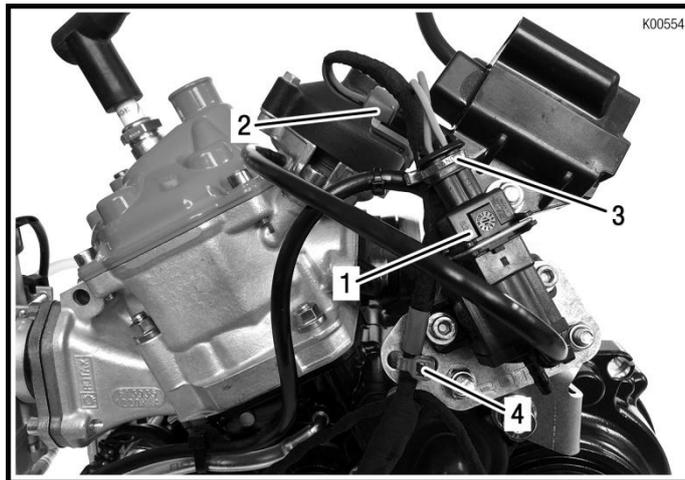


Fig. 18

- ➔ Remove the isolation tape from the shift contact wire (pos. 1) and loosely fasten with a tie wrap (pos. 2) (about 130 mm from the cable lug). See Fig. 19

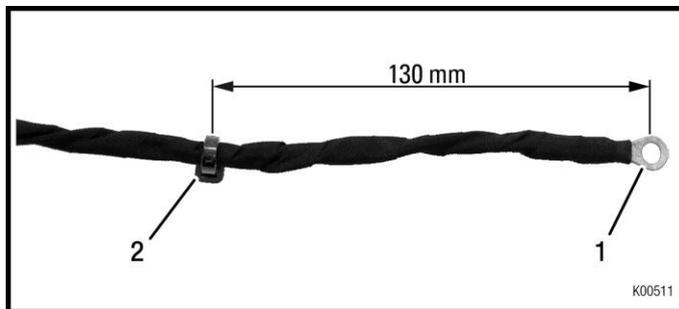


Fig. 19

- ◆ **Note:** Do not tighten the tie wrap yet in order to be able to change its position later on.
- ➔ Fasten the cable lug to the shift contact assy. using the Plastite screw M6x25 (pos. 3). Pay attention to correct sequence of components! See Fig. 20.
- ◆ **Note:** Fasten the cable lug (pos. 2) between the fuel tube 8 mm (pos. 4) and the Plastite screw M6x25 (pos. 3).

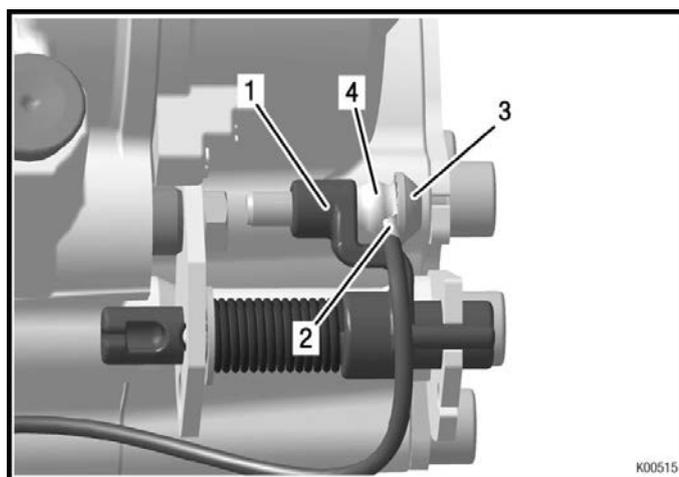


Fig. 20

- ➔ Fasten the wire of the shift contact assy. with a tie wrap (Pos. 1) on the bottom of the engine.

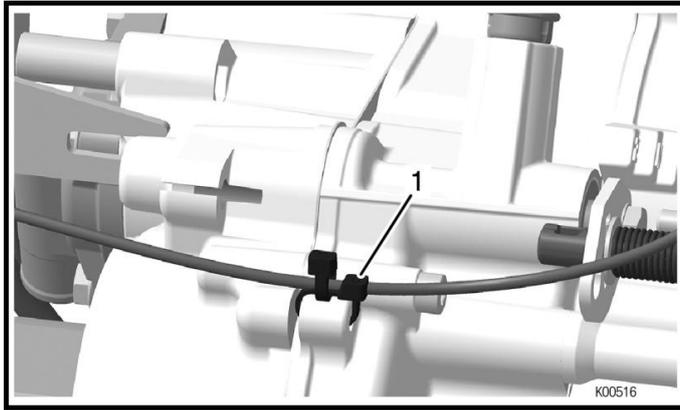


Fig. 21

- ➔ Connect pick-up connector to pick-up sensor (pos. 1). Pay attention to the engagement of the connector.  
See also section 10.2 for pick-up sensor orientation options.

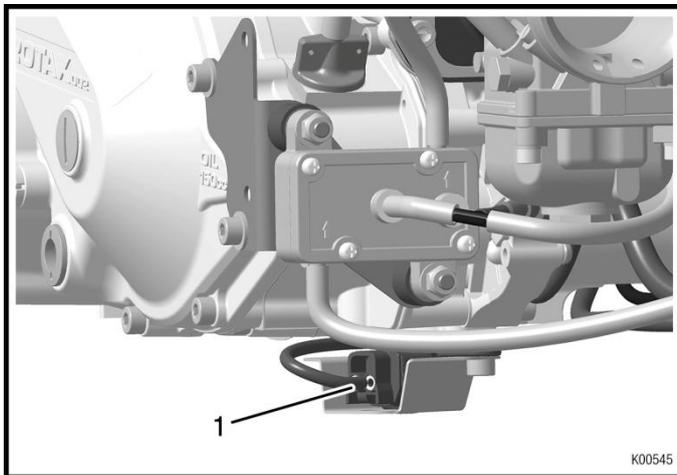
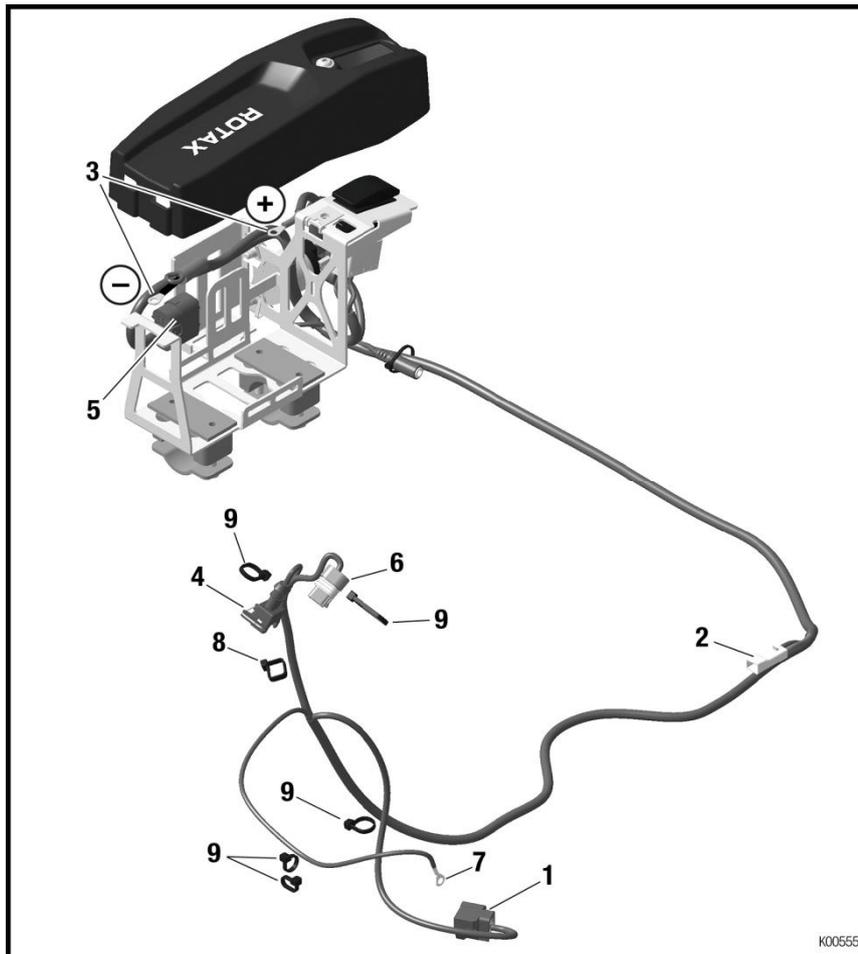


Fig. 22

➔ Attach ignition cables to the wiring harness. See Fig. 23.



K00555 Fig. 23

1. Connector pick-up sensor
2. Connector starter
3. Connector battery
4. Connector RAVE (only applicable 125 MAX evo)
5. Connector ECU
6. Connector ignition coil
7. Connector shift contact
8. Tie wrap 250x4.8
9. Tie wrap 142x3.2

## 12. Installation of the battery and ECU

### 12.1. Install ECU into the battery holder

- ➔ Prepare two rubber pads (pos. 1) and the control unit (pos. 2) for installation.

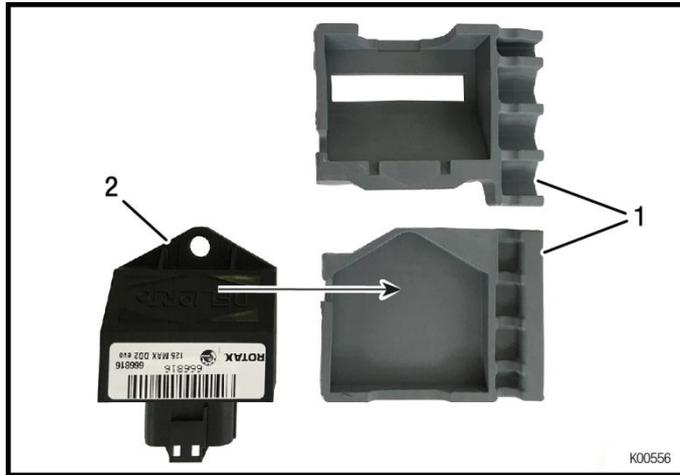


Fig. 24

- ➔ Install the control unit into the respective rubber pad.

**TIP:** Align at the triangular bottom of the control unit. It only fits the rubber pad in one position.

- ➔ Place the upper rubber pad (pos. 1) onto the control unit.

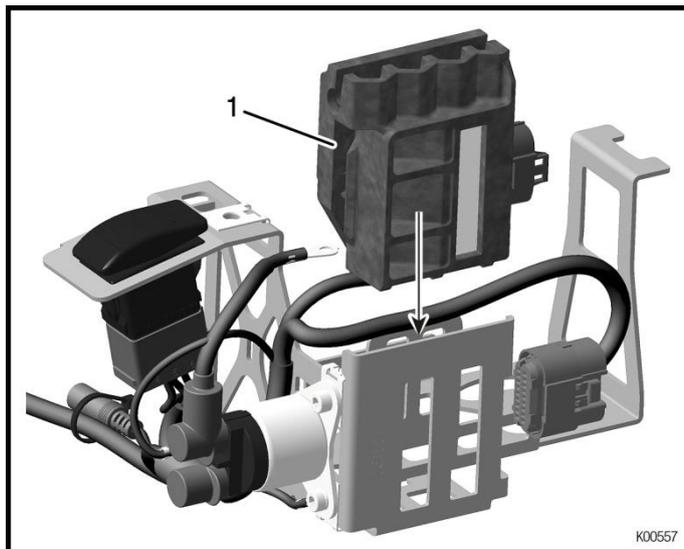
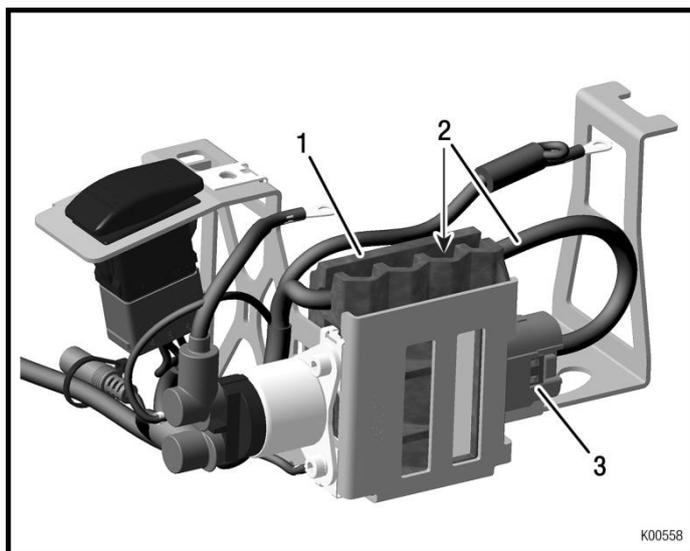


Fig. 25

- ➔ Insert the complete unit into the battery holder.

◆ **Note:** If difficulties during insertion occur, the inside of the battery holder can be slightly bent inward so that the distance increases. See *Fig. 26*  
Also, a bit of silicone spray may ease the installation.



K00558

Fig. 26

- **Attention:** Make sure that the connection cable (pos. 2) has been installed between the two pads (pos. 1). The connection of the ECU is on the rear side (against the driving direction).

## 12.2. Installation of the battery

See Fig. 27.

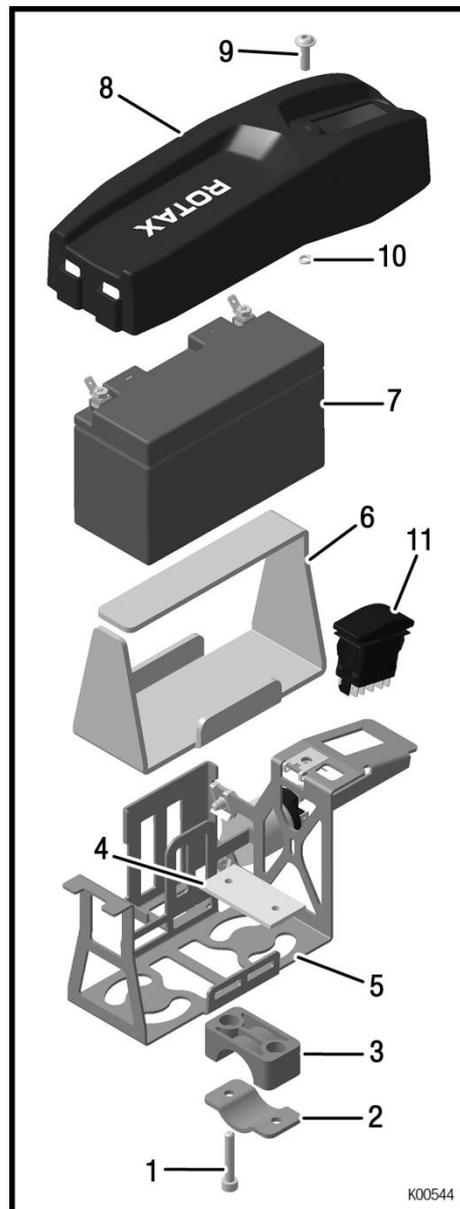
▲ **Warning:** Make absolutely sure to avoid short-circuiting of battery terminals. A short circuit will ruin the battery and could cause an explosion.

➔ Attach the battery fixture (pos. 5) with the two pipe clamps (pos. 1– 4) to the left side frame rail beside the driver's seat.

◆ **Note:** The clamps (pos. 2, 3) are designed for chassis tubes of 30 - 32 mm (1.18 – 1.26 in) in diameter.

■ **Attention:** Risk of clamp fracture! Do not over-tighten the screw (pos. 1) of the pipe clamps (pos. 2, 3).

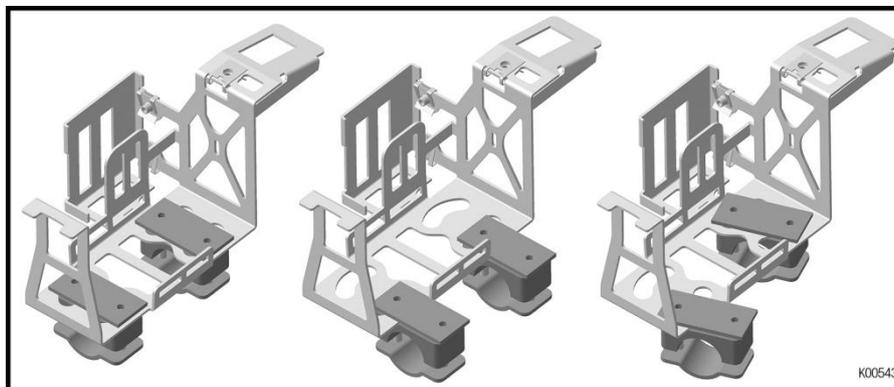
➔ Install rubber pad (pos. 6) with battery (pos. 7) into the battery holder (pos. 5).



K00544

Fig. 27

TIP: The battery fixture (pos. 5) can be fixed with one screw to one side of the clamp (pos. 3). See Fig. 28.



K00543

Fig. 28

- ◆ **Note:** The battery terminals (pos. 1) must point in the direction of the control unit. See Fig. 29

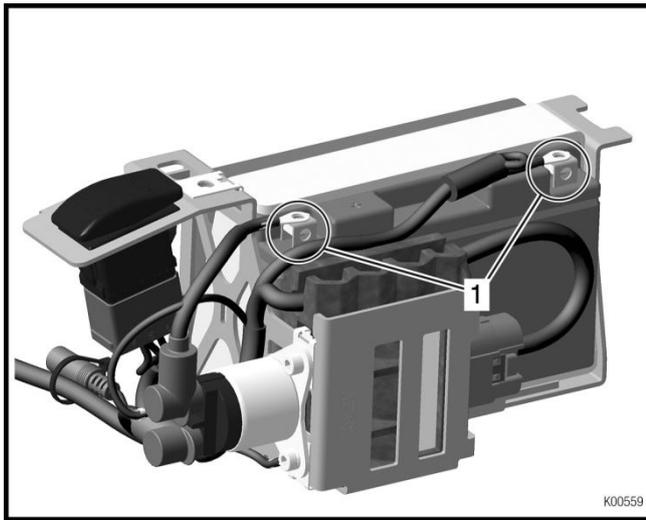


Fig. 29

- ➔ Connect the positive terminal (red) of the battery.
- ➔ Connect the negative terminal (black) of the battery.

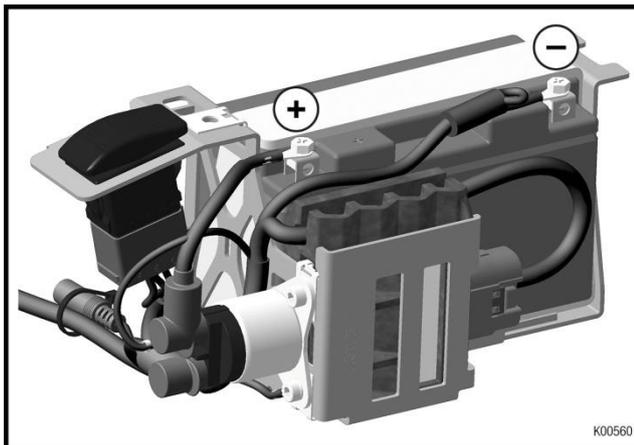


Fig. 30

- ➔ Install the battery cover onto the battery holder.
- ◆ **Note:** Make sure that the two retaining lugs (pos. 1/ Fig. 31) are in the notches of the battery cover!
- ➔ Tighten flange head screw (pos. 2/ Fig. 31) of the battery cover.



Fig. 31

### 13. Assembly of paddle shift system

- ➔ Install spacer (pos. 1) into the appropriate bore (pos. 2) of the engine housing.

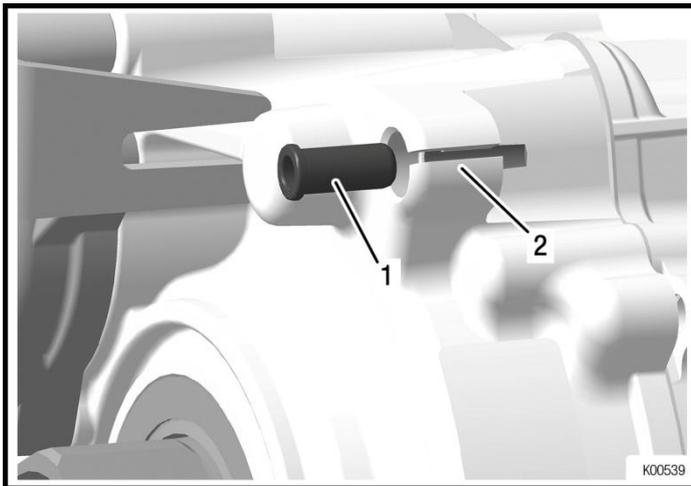


Fig. 40

- ➔ Install washer (pos. 1) on one of the two Bowden cables (pos. 2).

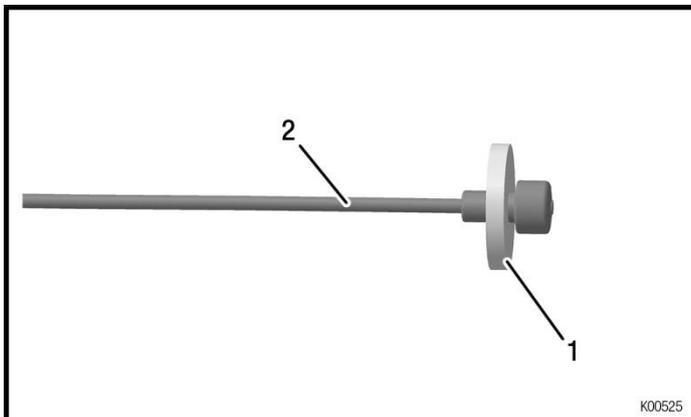


Fig. 41

- ➔ Mount Bowden cable (pos. 2) with washer (pos. 1) onto the shift contact guidance (pos. 3).

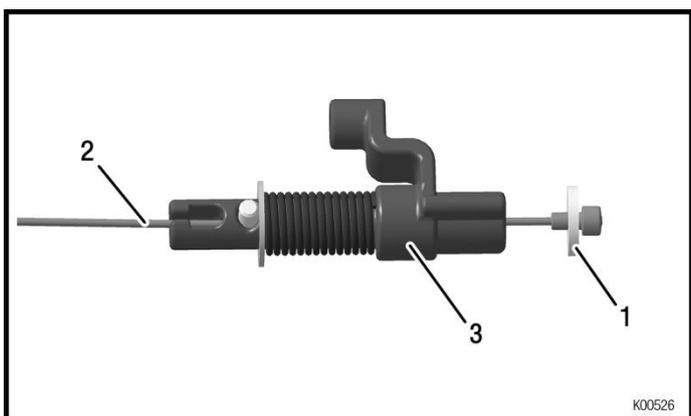


Fig. 42

- ➔ Mount Bowden cable with shift contact guidance (pos. 1) to the retaining plate (pos. 2).

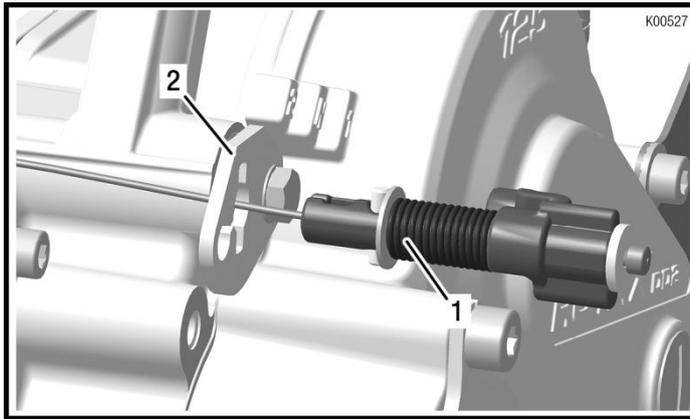


Fig. 43

- ➔ Mount Allen screw (pos. 1), lock washer (pos. 2) and spacer (pos. 3) together with the shift contact guidance (pos. 4) onto the engine housing. Tightening torque 22 Nm.

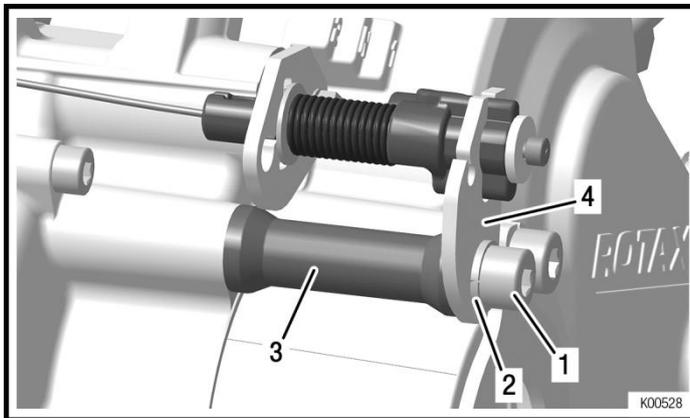


Fig. 44

- ➔ The alignment between point -1- and point -2- must be given. Otherwise it can cause increased friction, which has a negative impact on shifting behavior.

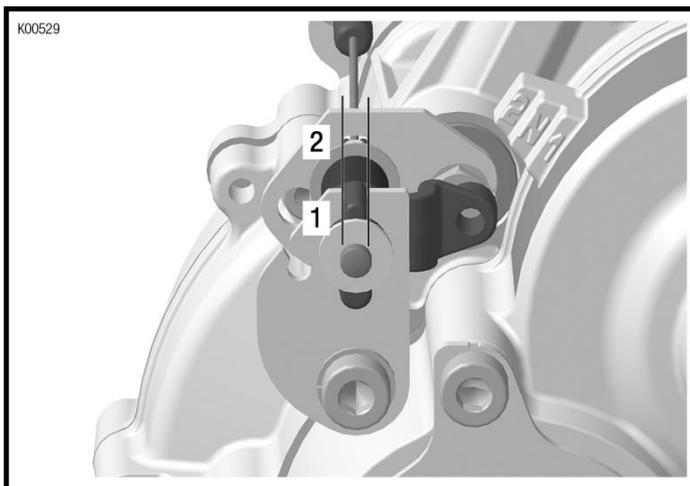


Fig. 45

- ➔ Mount sleeve (pos. 1) onto the retaining plate (pos. 2).

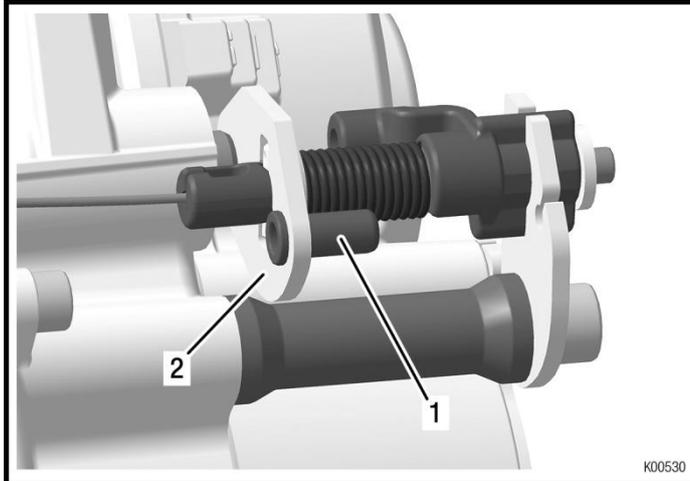


Fig. 46

- ➔ Mount second Bowden cable (pos. 1) through shift contact guidance and sleeve onto the retaining plate (pos. 2).  
No washer is necessary on this Bowden cable.

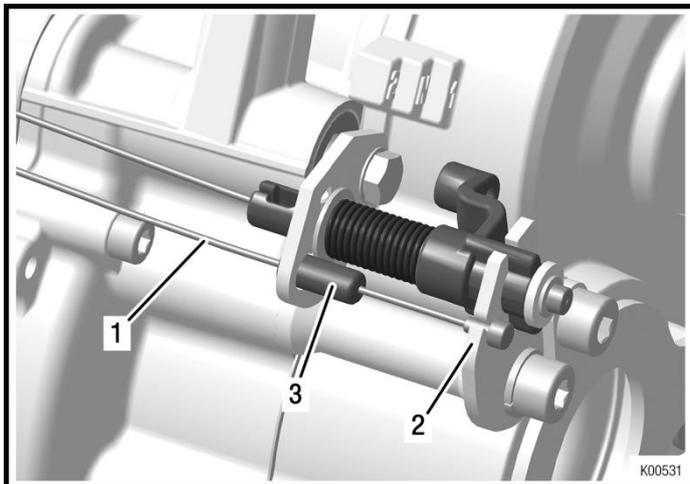


Fig. 47

- ➔ Install Bowden cables (pos. 1) into the support on the back of the engine.

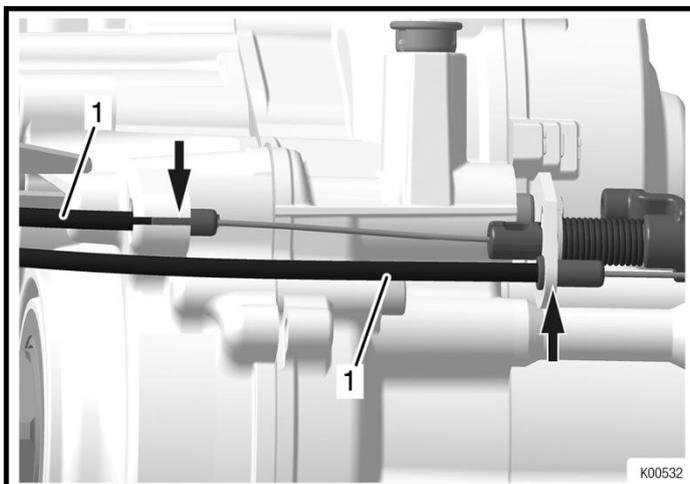


Fig. 48

- ➔ Thread both ends of the Bowden cables (pos. 1) through the cable support (pos. 2). Install the set screw (pos. 3) onto the cable support – just pre-assemble it, do not tighten yet.

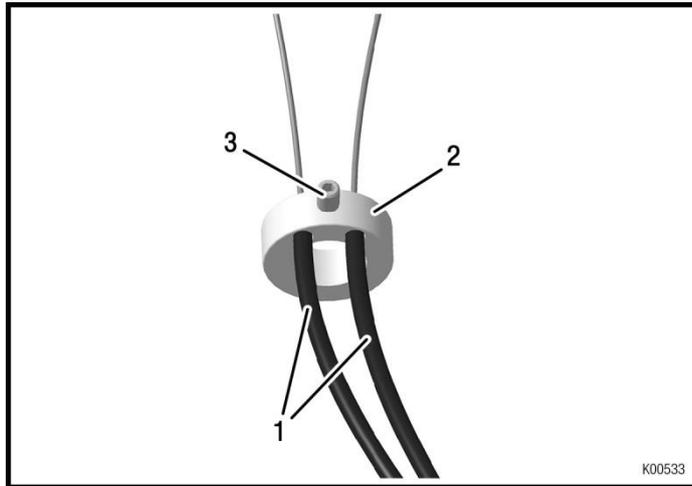


Fig. 49

- ➔ Hand-tighten both Bowden cables (pos. 1) onto the control whip (pos. 2) using M6 Allen screws (pos. 3) and washers (pos. 4). Pay attention to the correct installation of the control whip!

◆ **Note:** The oblique millings (pos. 5) of the control whip serve to guide the cables. The cable ends must look away from the center of the control whip.

The Bowden cables can be attached to the control whip in two different ways:

- Version 1:

Fasten Bowden cable to position 5 inside.  
Feature: Shift travel longer, but less effort.

- Version 2:

Fasten Bowden cable to position 5 outside.  
Feature: Short shift, but higher effort.

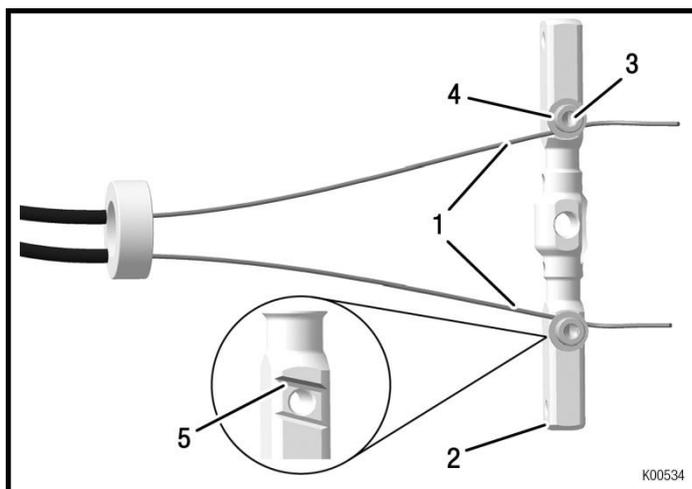


Fig. 50

- ➔ Hand-tighten control lever left and right (pos. 1) onto the control whip (pos. 4) using M6 Allen screws (pos. 2) and washers (pos. 3).

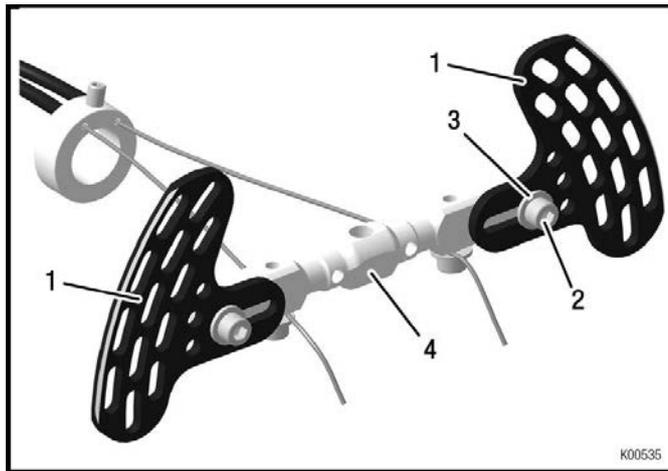


Fig. 51

- ◆ **Note:** The control lever can also be attached to the back, depending on how it is more ergonomic for the driver.

- ➔ Install spacer (pos. 1) with washer (pos. 2) onto the bottom side of the control whip (3).

- ◆ **Note:** The bottom side is, where the screws of the Bowden cables are fixed.

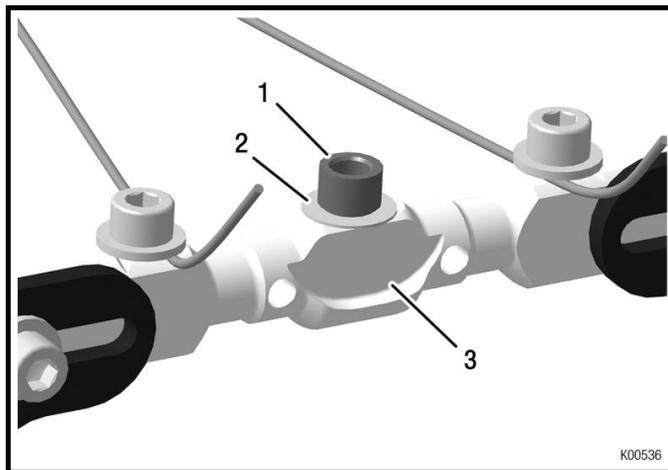


Fig. 52

- ➔ Tighten Allen screw M6x60 (pos. 1) and washer (pos. 2) onto the top of the control whip (pos. 3).

- ◆ **Note:** The top is the opposite side, where the screws of the Bowden cables are attached.

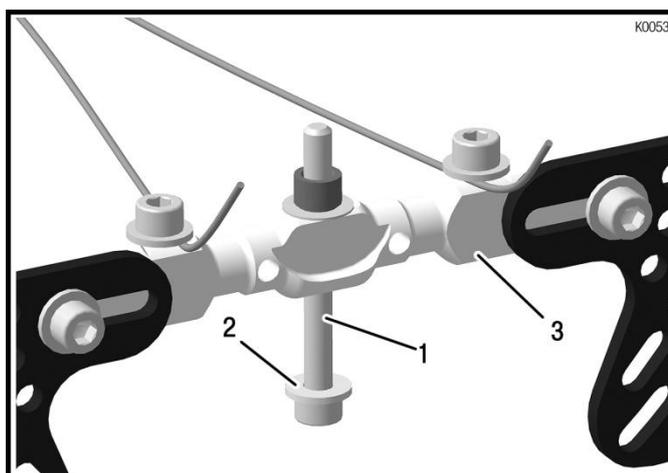


Fig. 53

- ➔ Place the entire shifting unit onto the steering wheel and tighten it using Allen screw M6x 60 (pos. 3) and M6 lock nut (pos. 1) with washer (pos. 2).
- ◆ **Note:** Control whip must run smoothly.
- ◆ **Note:** Spacer must fit into the bore provided on the steering wheel.

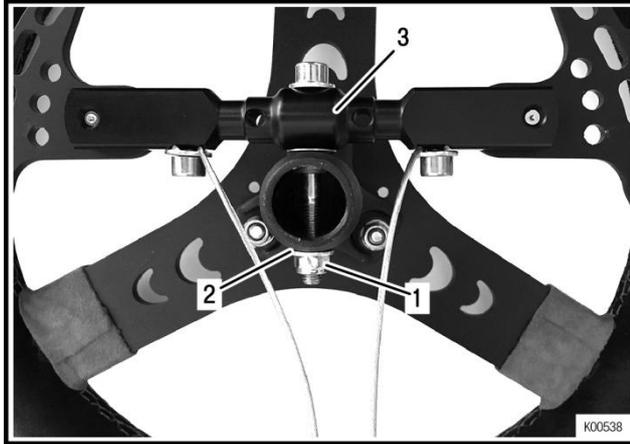


Fig. 54 (without handlebar)

- ➔ The setting of the shifting is carried out in neutral gear, which means that the control whip must be in horizontal position.
- ➔ Tighten the screw (pos. 2) of the cable abutment (pos. 1) and the screws of the Bowden cables on the control whip (pos. 3). See Fig. 55.
- ◆ **Note:** At full steering angle, no gear must engage. If a gear engages by itself, the distance between control whip and cable abutment must be adjusted.
- ➔ Finally, the length of the Bowden cables can be adjusted so that they do not disturb the driver when shifting.

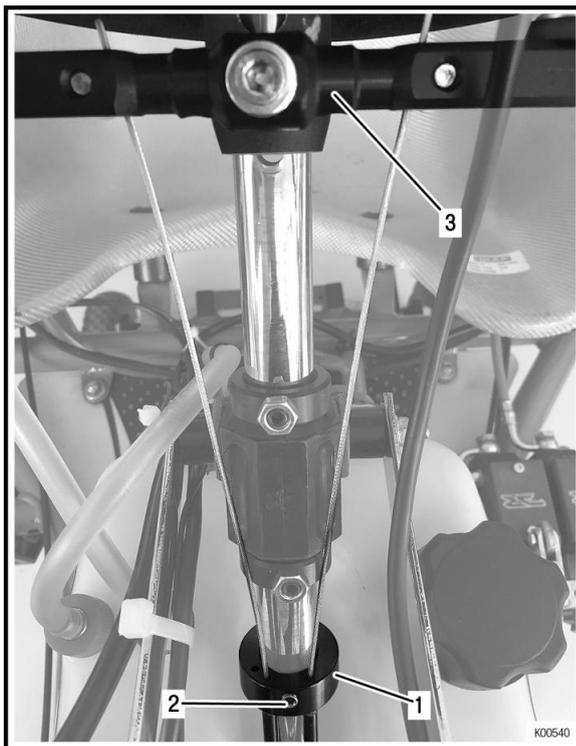
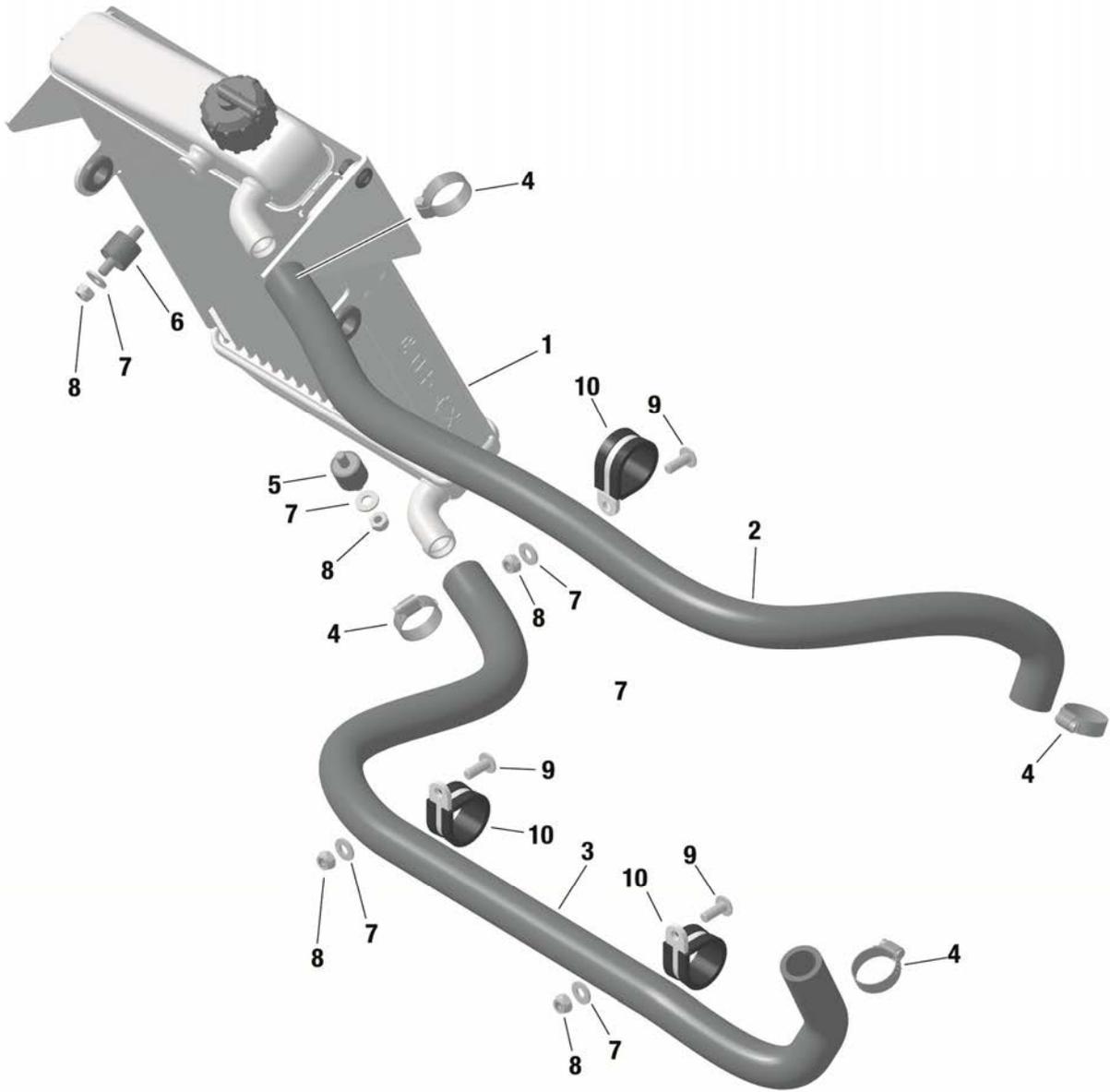


Fig. 55

## 14. Installation of the radiator

See Fig. 56.

- ➔ Mount the radiator (pos. 1) using the provided rubber buffer (pos. 5) and lock nut (pos. 8) with washer (pos. 7) on the lower support bracket on the chassis.
- ➔ Mount the radiator support with the rubber buffer (pos. 6) and lock nut (pos. 8) with washer (pos. 7) on the upper radiator mount and onto the chassis.
- ◆ **Note:** For an optimum cooling efficiency, we recommend to install the radiator in an angle of 25° +/- 5° tilted backwards.
- ▲ **Warning:** For radiator installation to the chassis, please follow the instruction of the chassis manufacturer.
- ➔ Put the four supplied hose clamps (pos. 10) on the coolant hoses.
- ➔ Push the upper coolant water hose (pos. 2) onto the upper socket of the radiator as well as onto the water socket of the cylinder head cover.
- ➔ Push the lower coolant water hose (pos. 3) onto the lower socket of the radiator as well as onto the water socket of the water pump housing.
- ➔ Secure the coolant hoses with the hose clamps (pos. 10).
- ➔ Secure the upper coolant water hose to the driver's seat (pos. 2) using the provided cable tie.
- **Attention:** The coolant water hose between the radiator and the engine must not rub with the driver's seat. Arrange the routing of the coolant water hose accordingly.
- ➔ Secure the lower coolant water hose (pos. 7) using two of the provided cable ties to the chassis.
- ▲ **Warning:** Please follow the instruction of the chassis manufacturer for mounting the lower coolant water hose onto the chassis.



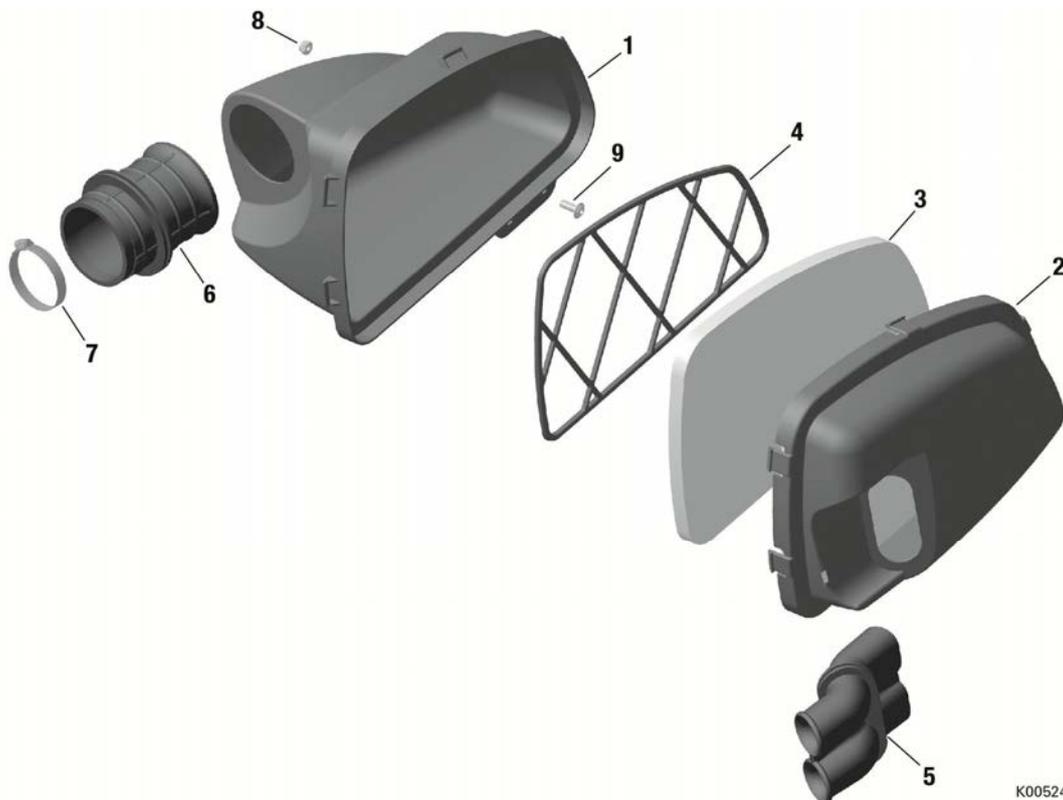
K00399 / Fig. 56

- ➔ Establish a connection between the overflow socket on the radiator filling socket and the overflow bottle with an appropriate piece of hose.
- **Attention:** To warrant the best possible engine cooling, ensure that the air stream covers the complete radiator area.

## 15. Installation of the intake silencer with integrated air filter

See Fig. 57.

- ➔ Install the rubber intake pipe (pos. 5) in a vertical position into the bottom half (pos. 2) of the intake silencer so that the rounded intake openings point outwards.
- ➔ Fit the carburetor socket (pos. 7) into the inner side of the silencer (pos. 1) so that the arrow on the socket points towards the carburetor.
- ➔ Install the filter element (pos. 3) with the holder (pos. 4).
- ➔ Assemble filter box and filter insert as shown in the following figure. Make sure that the locking is interlocked properly.
- ➔ Apply "Air filter cleaning kit" part no.: 297160 on the filter mat (pos. 3) and squeeze out surplus oil afterwards.
- ➔ Attach the intake silencer with the supplied hose clamps (pos. 8) to the carburetor.
- ◆ **Note:** The carburetor socket (pos. 7) is asymmetrical and can be turned so that the best possible position between carburetor and intake silencer can be achieved.
- ➔ Attach the intake silencer to the chassis using the M6 Allen screw with rounded flange head (pos. 10).



K00524

Fig. 57

## 16. Installation of the exhaust system

See Fig. 58.

- ◆ **Note:** On the underside of the exhaust system, two different mounting mechanisms are provided. At the front, the assembly is carried out with rubber buffers (pos. 7) between the retaining plate (pos. 6) and the exhaust system and attached by extension springs (pos. 8). At the rear, the exhaust system is mounted directly using a rubber mount M8 (pos. 9).
- **Attention:** A rigid suspension of the exhaust system could result in fractures in the exhaust system.
- ➔ Attach the heat-resistant rubber mount (pos. 9) to the support lug on the underside of the exhaust.
- ➔ Arrange the chassis-specific supports so that the exhaust system follows the straightest possible course from the exhaust socket on the cylinder to the muffler.
- ➔ The gasket (pos. 10) is the only sealing between the engine and the exhaust system. Additional heat-resistant Loctite is not necessary anymore.
- ◆ **Note:** A leakage in the exhaust system may lead to performance loss.
- ➔ Secure the exhaust system on the exhaust socket using the two supplied exhaust springs (pos. 14).
- ◆ **Note:** For easier installation use the special tool "spring hook" part no. 251680.
- **Attention:** Do not overstress the springs when fitting them.
- ➔ Attach the exhaust system to the chassis supports such that the sealing of the ball joint between cylinder and exhaust system will not be impaired.



## 17. Finishing work

To determine the best possible transmission ratio, the use of a rev-counter is required for observation of the speed limits.

To warrant engine operation within temperature limits of the coolant, a thermo-sensor for observation of the coolant temperature is required.

◆ **Note:** Refer to Operator's Manual (section 3.1) for limits of operation regarding coolant temperature.

### 17.1. Venting of the gear box

➔ Remove cap from the venting screw.

➔ Establish a connection between the venting screw and a collecting reservoir using a piece of the supplied fuel hose of an appropriate length.

◆ **Note:** The venting hose must not reach all the way to the bottom of the collecting reservoir.

■ **Attention:** Do not attach the venting hose to the bottom of the collecting reservoir, if only one reservoir is in use.

---

**▲ Warning: Before engine operation, read the Operator's Manual.**

**OPERATOR'S MANUAL FOR ROTAX ENGINE TYPE  
125 MAX DD2 evo**

**Table of Contents of the Operator's Manual**

<b>1. Design of the ROTAX engine 125 MAX DD2 evo .....</b>	<b>44</b>
<b>2. Technical description of the ROTAX engine type 125 MAX DD2 evo .....</b>	<b>44</b>
2.1. Type of engine .....	44
2.2. Cooling circuit .....	44
2.3. Balance gear .....	44
2.4. Ignition unit .....	44
2.5. Electric starter .....	45
2.6. Electro-pneumatical exhaust timing control.....	45
2.7. Intake silencer .....	45
2.8. Exhaust system .....	45
2.9. Gear box .....	45
2.10. Electronic Shifting Assistant (ESA) .....	45
2.11. Fuel pump .....	45
2.12. Carburetor .....	46
2.13. Centrifugal clutch.....	46
2.14. Overload clutch .....	46
<b>3. Media for engine operation.....</b>	<b>47</b>
3.1. Coolant.....	47
3.2. Battery and battery charging unit .....	47
3.3. Fuel .....	49
<b>4. Engine tuning .....</b>	<b>50</b>
4.1. Carburetor calibration .....	51
4.2. Choice of gear ratio .....	56
4.3. Exchange of gear reduction ratio .....	58
4.4. Operation of the gear box .....	59
4.5. Adjustment of gear shifting .....	60
<b>5. Operating limits.....</b>	<b>61</b>
<b>6. Engine start and operation .....</b>	<b>61</b>
6.1. Starting the engine .....	61
6.2. Stopping the engine.....	62
6.3. Running-in procedure for the engine.....	63
6.4. Setting of the exhaust valve timing .....	64
6.5. Maintenance schedule for engine components.....	66
<b>7. Transport of the kart .....</b>	<b>67</b>
<b>8. Preservation of engine and equipment.....</b>	<b>67</b>

## 1. Design of the ROTAX engine 125 MAX DD2 evo

- 2.1. Single-cylinder two-stroke engine, reed valve controlled, 125 cm<sup>3</sup> displacement
  - 2.2. Cooling circuit
  - 2.3. Balance gear
  - 2.4. Ignition unit
  - 2.5. Electric starter
  - 2.6. Electro-pneumatically controlled exhaust timing
  - 2.7. Intake silencer
  - 2.8. Exhaust system
  - 2.9. Gear box
  - 2.10. Electronic Shifting Assistant (ESA)
  - 2.11. Fuel pump
  - 2.12. Carburetor
  - 2.13. Centrifugal clutch
  - 2.14. Overload clutch
- 
- 

## 2. Technical description of the ROTAX engine Type 125 MAX DD2 evo

### 2.1. Type of engine

Single-cylinder two-stroke engine with reed valve controlled inlet. Proper mixture lubrication is achieved by adding oil to the gasoline in a specified mixing ratio.

The power transmission to the rear axle takes place via a manually shift able integrated 2-speed gearbox.

---

### 2.2. Cooling circuit

The coolant is pumped from the radiator to the water pump, which is driven by the clutch shaft. The water pump conveys the coolant through the cylinder and the cylinder head back to the radiator.

The cooling circuit is equipped with a thermostat (opening point 45 °C / 113 °F). It assures that the engine reaches its operating temperature quickly and keeps it at a relatively constant level.

The thermostat is integrated in the cylinder head cover.

---

### 2.3. Balance gear

The balance gear is mounted on the primary shaft and rotates counter-wise to the crankshaft to reduce engine vibration.

---

### 2.4. Ignition unit

The control of the ignition system is exercised by the ECU (Engine Control Unit). To calculate the ignition timing, an engine speed sensor is needed, which is installed on the bottom of the engine housing. There is no manual adjustment of the ignition system necessary and/or possible.

If the power button is pressed once, the ignition is activated and the button lights up. To start the engine, it only needs to be pressed once again. To turn off the engine as well as the ignition, proceed in reverse order.

---

## **2.5. Electric starter**

By pressing the start button, the circuit between the battery and the electric starter will be closed by a relay. The electric starter drives the starter gear on the crankshaft via an intermediate gear with free-wheeling, until the engine starts to run. An automatic switch reset from "START" to "ON" is integrated.

---

## **2.6. Electro-pneumatical exhaust timing control**

The engine type 125 MAX DD2 evo is equipped with an electro-pneumatic exhaust control. The ERAVE (Electronic ROTAX Adjustable Variable Exhaust) system is controlled by an electro-pneumatic valve via the ECU. The vacuum required is provided by the engine crankcase.

At engine stop, the exhaust valve is in idle mode and therefore in the open position. With the engine running, it closes or opens the electro-pneumatic valve of the exhaust depending on the speed and, therefore, it provides optimum performance characteristics.

---

## **2.7. Intake silencer**

The intake silencer incorporates an air filter to clean the intake air. The intake silencer has been designed for optimum reduction of air intake noise level and represents a tuned system with the engine.

The air filter consists of several layers and has been optimized in the area of air passage and filter efficiency. If soiled or during engine maintenance work, clean the filter with biodegradable products.

---

## **2.8. Exhaust system**

The exhaust system is designed as a resonance system with an after-muffler and represents a tuned system with the engine.

---

## **2.9. Gear box**

The power transmission to the rear axle takes place via a manually shiftable integrated 2-speed gearbox and not as usual, via a maintenance-intensive chain drive. Changing the gear activates the gear shift fork as well as a shifting sleeve, which slides on the hollow shaft between the 1<sup>st</sup> and 2<sup>nd</sup> gear and then engages in the respective idle gear.

The gear is kept in position by an index pin, which keeps the gearshift fork in the selected position, 1<sup>st</sup> gear, neutral or 2<sup>nd</sup> gear.

To allow shifting into the 2<sup>nd</sup> gear without lifting the foot from the gas pedal, the ignition is cut off for a moment when actuating the shifting paddle.

---

## **2.10. Electronic Shifting Assistant (ESA)**

To optimize the shifting from 1<sup>st</sup> to 2<sup>nd</sup> gear, the ignition is interrupted for a short time. This releases load from the gearbox and, like this, gear shifting is faster and less stressful for the gearbox.

---

## **2.11. Fuel pump**

The fuel pump functions due to the alternating negative pressure and overpressure in the crankcase and sucks fuel from the fuel tank into the carburetor via the fuel pump. In the suction

side of the fuel pump (between fuel tank and fuel pump), a fuel filter is installed to prevent contamination of the fuel pump and carburetor.

---

### **2.12. Carburetor**

The carburetor (DELL'ORTO VHSB 34) is a slide-type carburetor with float system. The standard main jet is suitable for almost all operating conditions. For extreme operating conditions, the main jet size must be adjusted to the actual conditions according to this manual.

---

### **2.13. Centrifugal clutch**

The engine is equipped with a centrifugal clutch operating in an oil bath. This clutch separates the engine from the gearbox at less than 2.500 rpm. Only at an engine speed of approx. 4.000 rpm. the centrifugal clutch is completely engaged.

---

### **2.14. Overload clutch**

The engine has a mechanical overload clutch, which is installed on the rear axle. It is to protect the crankshaft from hard shocks from the drive components which are not usual during normal operation (e.g. the blocking of the rear axle).

---

---

### 3. Media for engine operation

#### 3.1. Coolant

A mixture of distilled water and aluminum-compatible antifreeze has to be used as coolant. Follow the antifreeze specifications to ensure protection against freezing up to a temperature of -20 °C / -4 °F.

- ◆ **Note:** Please follow the local regulations concerning the use of antifreeze on the race track.
  - ➔ Open radiator cap and fill the system with coolant (approx. 0.7 liter / 0.185 gal for the complete cooling system).
  - ➔ Close radiator cap.
  - ▲ **Warning:** The engine temperature should not exceed 85 °C / 185 °F. Exceeding the engine temperature could lead to serious engine failure.
- 

#### 3.2. Battery and battery charging unit

See *Fig. 1*

The power for the ignition unit and electric starter is only supplied by the battery. With a fully charged battery of 12 V and 6.5 Ah, the engine can be started approximately one hundred times and operated over a period of approximately five hours. With the battery voltage decreasing to approximately 11 V, the point will be reached where the battery voltage is too low to generate a spark for ignition.

- **Attention:** The lifespan of the battery will be drastically reduced by exhausting the battery completely. Therefore, it is recommended to fully re-charge the battery before and after any operation of the kart.
- ◆ **Note:** It is recommended to always carry a charged spare battery. The installed battery should be replaced with a fully charged battery before it is completely exhausted.
- ◆ **Note:** If the spark plug is removed to check if the battery still generates a spark, consider the following: with the spark plug removed it is easier for the electric starter to crank the engine, which reduces current absorption of the electric starter, resulting in a battery voltage adequate to generate a spark. If the spark plug is fitted again, it may happen that the engine does not start.
- ◆ **Note:** To charge a battery, the delivered battery charging unit specified by ROTAX should be utilized (charging unit, part no. 265148). When using the lithium battery available as spare part, the battery charger Optimate Lithium (part no. 581325) is recommended.
- ◆ **Note:** To be able to use the battery charger in your home country, please contact your nearest authorized ROTAX distributor or one of their ROTAX service centers to receive an adapter plug or adapter cable, respectively.
- ◆ **Note:** This battery charger will switch over automatically to maintenance charge as soon as the target voltage is reached. Therefore overcharging with the result of ruining the battery will be impossible.
- **Attention:** The use of any other battery charger can impair the battery life or may ruin the battery.

When charging the battery, take note of the following:

- ➔ Connect the battery charger to the charging connector (pos. 1).



Fig. 1

- ➔ Connect the battery charging unit to a 110-230V, 50-60Hz power supply. During the charging procedure, the charge indicating lamp will light up red.
- ➔ At completion of the charging process, the control lamp will change to green, but the charging current will remain, thus warranting a fully charged battery.
- ➔ The charging time amounts to approx. 12 hours.
- ◆ **Note:** The battery charger may be connected to the battery for a longer period, as the battery takes just the current required to be fully charged.
- ◆ **Note:** A non-extinguishing red control lamp, even after 24 hours of charging, indicates that the charging capacity of the battery is diminishing.
- ◆ **Note:** A red/green blinking of the charging control lamp indicates transition from main charging to additional charging and does not signal a faulty battery charger.
- ➔ Unplug power supply to battery charging unit.
- ➔ Remove output wires of the battery charger from the battery.
- ➔ The battery is ready again for use.
- **Attention:** In addition to these directives, follow the advice of the battery charging unit manufacturer.
- ◆ **Note:** When the battery is charged while not mounted on the kart, use the adapter cable (part no. 266022). If needed, contact your authorized distributor or one of their ROTAX service centers.

The charging condition of the battery can be estimated using a commercially available measuring instrument.

### 3.3. Fuel

For engine operation, a mixture of unleaded gasoline of at least ROZ<sub>min.</sub> 95 / 91 (RON+MON) / 2 and **fully synthetic** two-stroke oil, mixed at the ratio of 1:50 (2 % oil) has to be used.

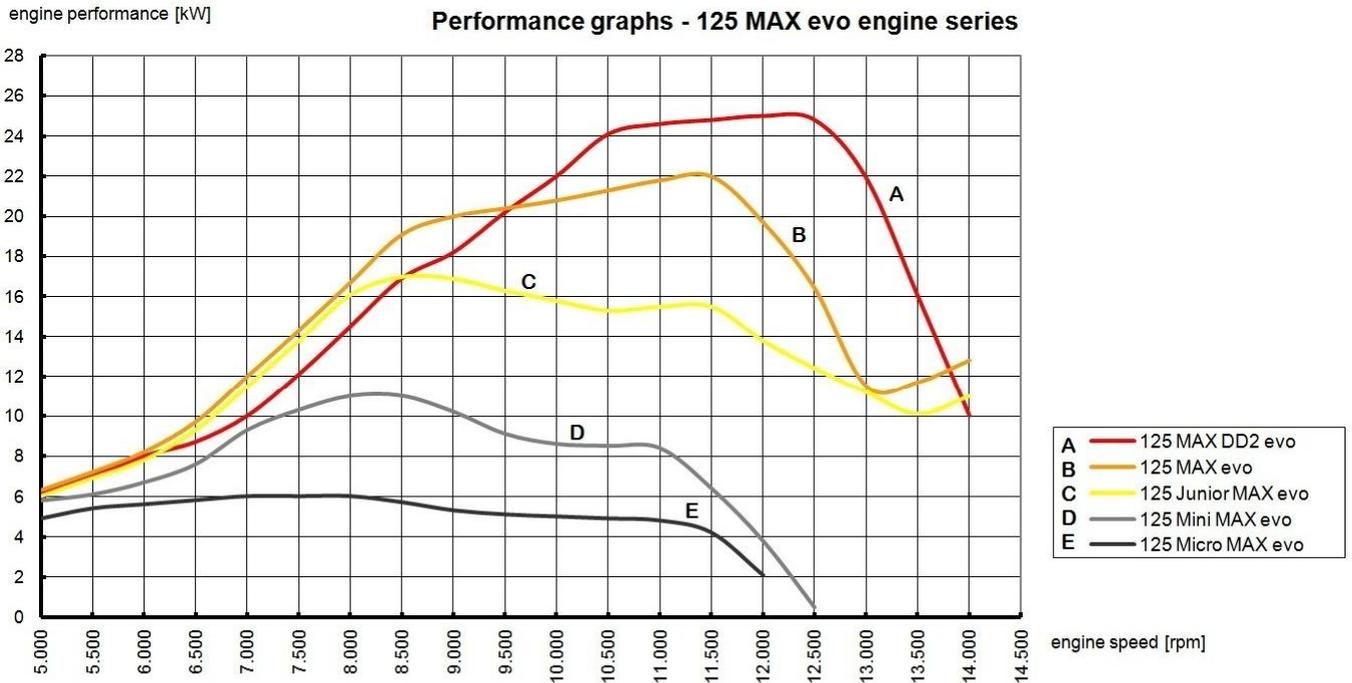
- **Attention:** Carry out a correct running-in procedure. See section 6.3.
  - **Attention:** Too much oil in the fuel mixture (more than 2 %) could lead to engine trouble (e.g. choking of the exhaust valve, piston ring sticking).
  - **Attention:** Insufficient amount of oil in the fuel mixture (less than 2 %) could result in engine trouble (e.g. piston seizure).
  - ▲ **Warning:** **Do not try any different sorts of fuel. This could lead to engine damage and damage to the intake system.**
  - ▲ **Warning:** **When mixing fuel and while fuelling, do not smoke or allow naked flames. Gasoline is highly flammable and explosive under certain conditions.**
  - ▲ **Warning:** **Never perform mixing and fuelling in closed rooms, handle fuel in well-ventilated areas only.**
  - ▲ **Warning:** **Before each fuelling, shake fuel container well to ensure adequate mixing of gasoline and oil.**
  - ▲ **Warning:** **Fuel the kart only when the engine is not running and the combination switch is at OFF position.**
  - ▲ **Warning:** **Make sure that the fuel does not splash onto hot engine components or equipment. Risk of fire and explosion!**
  - ▲ **Warning:** **Pay attention to the safety advice of the kart manufacturer!**
  - **Attention:** Do not spill fuel. Absorb spilled fuel with appropriate drying agent and ensure ecological disposal.
  - **Attention:** Ensure that no contamination enters the fuel tank and the carburetor.
  - **Attention:** Unleaded fuel has a limited storage life. Store only the quantity of fuel in a container which will be needed in the near future.
-

## 4. Engine tuning

### Performance graphs

In this diagram, the different performance characteristics of the MAX engines are shown. The vertical Y-axis shows the power in kilowatts (kW). The horizontal X-axis shows the rotational speed in revolutions per minute (rpm).

For more information, please check the performance data sheets on [www.rotax-kart.com](http://www.rotax-kart.com).



\* Leistungsangaben nach ISO 15550 und ISO 4106 / Performance information according to ISO 15550 and ISO 4106

K00414

#### 4.1. Carburetor calibration

The standard carburetor calibration is set for an ambient temperature of 25 °C / 77 °F and 400 m / 1310 ft above sea level. For an operation at different temperatures and altitudes, the main jet of the carburetor has to be changed to optimize engine performance.

- ◆ **Note:** For engine operation at an ambient temperature below 10 °C / 50 °F, make sure not to demand full power before the coolant temperature has reached 45 °C / 113 °F.
- ◆ **Note:** The warranty by BRP-Rotax will no longer apply, if the carburetor calibration is carried out improperly and causes engine damage.

The following application for smartphones shows the individual setting of your ROTAX 125 Max engine:

The Rotax Max Jetting Guide is an app for Android™ and iOS devices, designed to assist users with setting up the recommended main jet based on the ambient conditions and the type of engine. The perfect set-up can be calculated in two ways, either automatically - which requires a GPS signal and an internet connection, or manually - which requires certain knowledge about altitude and weather conditions.

##### Automatical set-up:

1. Click on the white button located at the top of the screen saying “USE GPS POSITION FOR WEATHER DATA”. After a short time the app will automatically provide all the necessary information regarding weather and geographical position.
2. As a second step, the engine type of the kart needs to be selected. Therefore, the button underneath the weather data needs to be clicked. The app will automatically show all potential Max evo engines, from which one can be selected by clicking on a certain engine type.
3. After all the necessary information has been provided and selected, you only need to click the circular red button saying “CALCULATE” at the bottom of the screen.



- Now the recommended main jet value will be provided. In case a second calculation needs to be made, you can start over by simply pressing the button saying "RESET" next to the calculated value.



### Manual set-up:

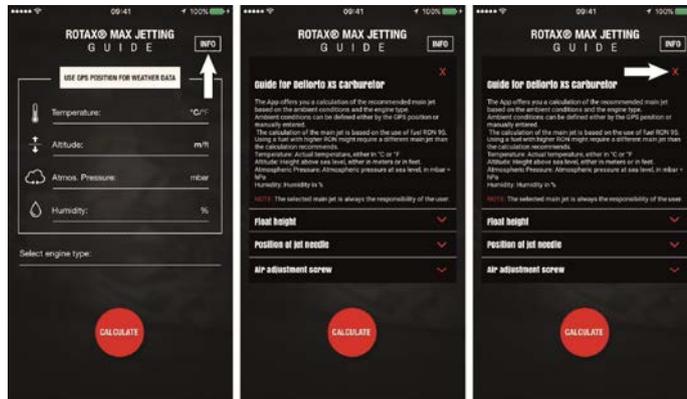
- In case no GPS signal or internet connection is available, the necessary data needs to be added manually, which of course requires knowledge about current weather conditions at the race track as well as the altitude. By clicking on the empty space next to "Temperature", "Altitude", "Atmos. Pressure" and "Humidity", you are able to enter the required information. In terms of "Atmos. Pressure", the atmospheric pressure at sea level has to be entered, usually the barometer shows the actual level.
- As a second step, the engine type of the kart needs to be selected. Therefore, the button underneath the weather data needs to be clicked. The app will automatically show all potential Max evo engines, from which one can be selected by clicking on a certain engine type.
- After all the necessary information has been provided and selected, you only need to click the circular red button saying "CALCULATE" at the bottom of the screen.
- Now the recommended main jet value will be provided. In case a second calculation needs to be made, you can start over by simply pressing the button saying "RESET" next to the calculated value.

### Additional Information

- In case values are being entered manually, the provided numbers will turn from white to red if they are considered to be unrealistic.
- Depending on their preference, users can decide if they would like to use the metric or the imperial system. You can change between Celsius and Fahrenheit by simply clicking on the small °C or °F next to the value for temperature. The same works with feet and meter, where you can just click on the small m or ft located next to the value for altitude in order to change between the systems.



- In the top right corner, you can find a button called “INFO”. By clicking this button, additional information about the app as well as setting up the carburetor like float height, position of the jet needle or the air adjustment screw can be found. By clicking the small red X underneath the info button, you can return to the home screen.



For further information a YouTube video is available from the following QR-code:



## APP Download

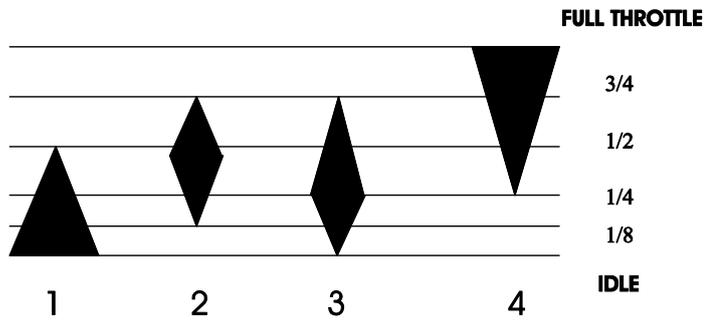
Please scan the following QR-code for your Android phone:



Please scan the following QR-code for your iOS phone:



For better understanding and as help for carburetor adjustment, the following figure describes the effect of the various adjustments, depending on the throttle position.



1 - AIR SCREW AND PILOT JET

2 - TYPE AND POSITION OF JET NEEDLE

3 - TYPE OF NEEDLE JET

4 - MAINJET

K00264



- ◆ **Note:** In a disassembled carburetor, the position of the jet needle (pos. 3) can be changed. The standard position of the jet needle is 'position 2'. If the clip (pos. 4) is set in 'position 1' of the jet needle, the full mixture in part and full-load will become slightly leaner. If the clip (pos. 4) is set into 'position 5', the fuel mixture will become slightly richer in the part and full-load range.
- ◆ **Note:** The fuel filter (pos. 32) is located below the fuel inlet on the carburetor, preventing contamination from entering the carburetor, which could impair operation of the carburetor.
- **Attention:** The fuel filter (pos. 32) must be inspected periodically and cleaned as required.
- ➔ Remove the hex. screw (pos. 34) and gasket ring (pos. 33).
- ➔ Pull out the fuel filter (pos. 32) and clean the filter and fuel inlet.
- ➔ Refit the fuel filter (pos. 32), the gasket ring (pos. 33) and hex. screw (pos. 34).
- ◆ **Note:** When trying to start the engine, it will take a few seconds for the fuel pump to fill the float chamber and for the engine to start.
- ◆ **Note:** With the adjustment screw (pos. 36), the idle speed of the engine can be adjusted. By turning in the adjustment screw (pos. 36) the idle speed increases and by turning out the screw (36) the idle speed will be reduced.
- ◆ **Note:** With the adjustment screw (pos. 31), the fuel mixture formation can be adjusted. By turning in the adjustment screw (pos. 31), the air-fuel mixture will become richer at idling and by turning out the screw (pos. 31), the air-fuel mixture will become leaner at idling. The default setting of the adjustment screw are two full turns and one quarter of a turn (2 ¼) from inside to outside.

---

## 4.2. Choice of gear ratio

In spite of its 2 gears, the 125 MAX DD2 evo engine offers a broad performance band. Therefore, the frequent changing of the primary gear ratio is not necessary.

- ◆ **Note:** It is not possible to change the 1<sup>st</sup> and 2<sup>nd</sup> gear individually.

On most of the Kart circuits you will be well served with the standard gear ratio (35/62, which is equivalent to 12/90 for 1<sup>st</sup> gear and 14/79 for 2<sup>nd</sup> gear).

If, due to the special shape of the circuit (e.g. extremely sharp corners or long straights), it is deemed necessary, the primary gear ratio can be changed to both, a shorter or a longer ratio.

If the rpm range from 9.200 to 12.200 rpm is not sufficient because of a particular track shape (extremely long straight), the maximum engine speed of 13.600 rpm should be aimed for.

- ◆ **Note:** A basic requirement for the full use of the speed range between 12.200 to 13.600 rpm is an optimized carburetor jetting (see chapter 4.1. Carburetor calibration).

The acceleration potential between 9.200 and 12.200 rpm is essentially higher than between 12.200 and 13.600 rpm. Therefore, it does not always make sense to use this rpm range (high top speed on a straight) and to not take advantage of the acceleration potential of the lower rpm range (out of sharp corners).

This is a suggestion. The optimum choice can only be found with the exact knowledge of the race track.

To approach and optimize the reduction gear ratio, the following charts should be helpful.

The optimization procedure regarding the reduction gear ratio for a new race track is explained step-by-step in the following example:

- ➔ Start with the standard gear ratio (35/62, equivalent to 12/90 in 1<sup>st</sup> gear and 14/79 in 2<sup>nd</sup> gear).

Based on the following criteria, you must decide, whether a shorter or longer gear ratio is necessary.

**Does the engine reach 12.500 rpm in 2<sup>nd</sup> gear at the end of the longest straight?**

**IF YES:**

- ➔ Choose the next longer gear ratio (36/61 equivalent to 12/87 in 1<sup>st</sup> gear and 14/76 in 2<sup>nd</sup> gear).

**IF NO:**

- ➔ Choose the next shorter gear ratio (34/63 equivalent to 11/87 in 1<sup>st</sup> gear and 14/83 in 2<sup>nd</sup> gear).

If these gear ratios are still not sufficient, try the next shorter or next longer gear ratio.

◆ **Note:** When using short gear ratios, it may happen that the response behaviour of the engine in 1<sup>st</sup> gear is aggressive and the vehicle handling becomes difficult. For a good lap time, often a longer gear ratio is helpful to achieve reasonable performance behaviour.

◆ **Note:** To help with the choice of adequate gear ratios, the two charts below illustrate the traditional gear ratios and the top speeds in [kmh] that can be reached in the respective gear at an engine speed of 12.500 rpm.

Gear ratio 1st gear				
Number of teeth on primary drive gear	Number of teeth on secondary drive gear	1. gear overall gear ratio	Traditional gear ratio (in sprocket sizes)	theoretical max. speed (in km/h / mile/h) (at 12.500 r.p.m. and wheel diameter 870 mm / 34,25 in.)
32	65	8,65	10 to 87	75 / 47
33	64	8,26	11 to 91	79 / 49
34	63	7,89	11 to 87	83 / 52
<b>35</b>	<b>62</b>	<b>7,55</b>	<b>12 to 90</b>	<b>86 / 53</b>
36	61	7,22	12 to 87	90 / 56
37	60	6,91	12 to 83	94 / 58
38	59	6,61	12 to 80	99 / 62
gear ratio of 1st gear (cannot be changed)		4,26		

Gear ratio 2nd gear				
Number of teeth of primary drive gear	Number of teeth of secondary drive gear	2nd gear overall gear ratio	Traditional gear ratio (in sprocket sizes)	theoretical max. speed (in km/h / mile/h) (at 12.500 r.p.m. and wheel diameter 870 mm / 34,25 in.)
32	65	6,52	14 to 91	100 / 62
33	64	6,23	14 to 87	105 / 65
34	63	5,95	14 to 83	110 / 68
<b>35</b>	<b>62</b>	<b>5,69</b>	<b>14 to 79</b>	<b>115 / 72</b>
36	61	5,44	14 to 76	120 / 75
37	60	5,21	14 to 73	125 / 78
38	59	4,98	15 to 75	131 / 81
gear ratio of 2nd gear (cannot be changed)		3,21		

- ◆ **Note:** To facilitate the change of gear ratio, it is recommended to carry a clutch drum with a primary drive gear and the respective secondary gear for each gear ratio.
- ◆ **Note:** To allow easier matching of primary and secondary gears, please note that the sum of the last digits of the teeth number must always be 7 or 17 (**35 / 62**).

#### 4.3. Exchange of gear reduction ratio

See Fig. 3 and Fig. 4.

At first glance, the exchange of the gear ratio seems to be more complicated than you are used to. If, however, you follow the hints below, you will notice that the work involved is not much different.

- ➔ Lift engine side of the kart and place the vehicle on a trolley.
- ➔ Remove the right rear hub with wheel.
- ➔ Unscrew 4 Allen screws M6x30 (pos. 1), 4 Allen screws M8x70 (pos. 2) and 2 Allen screws M6x40 (pos. 3). Remove the gear cover.
- ◆ **Note:** If the gear cover is difficult to remove, it can be levered off at the separating lugs.

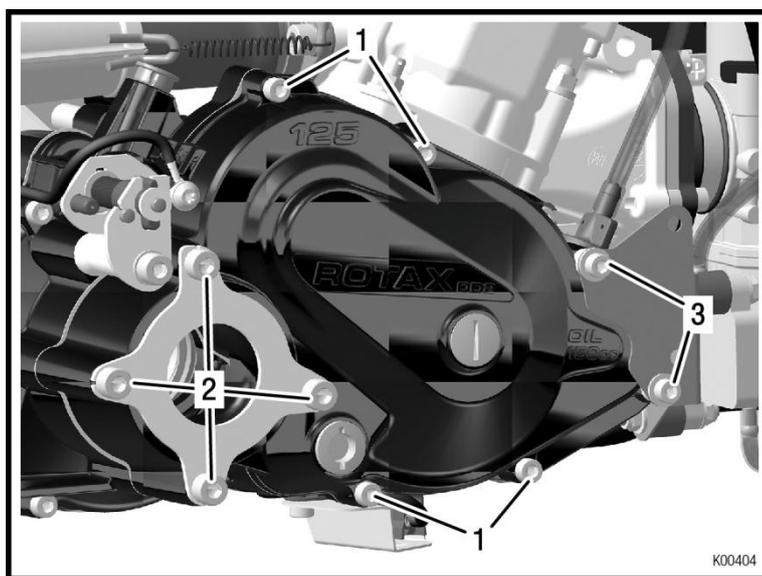


Fig. 3

- ➔ Remove the primary drive gear (pos. 4) and secondary gear (pos. 5) and fit the gear pair of your choice (Fig. 4).

At re-assembly, proceed in reverse sequence. Tighten the screws to the following torque settings:

- M6: 10 Nm (88 lbf. in.)
- M8: 22 Nm (195 lbf. in.)

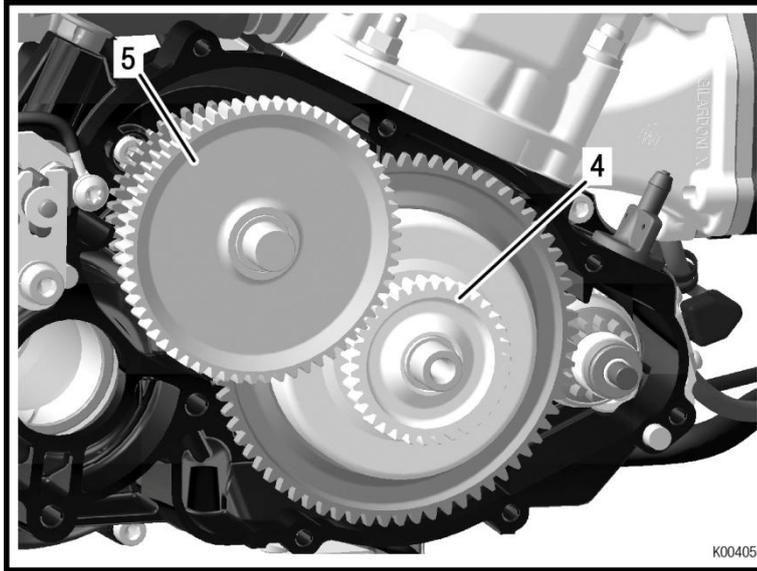


Fig. 4

- ◆ **Note:** To allow easier matching of primary and secondary gears, please note that the sum of the last digits of the teeth number must always be 7 or 17 (35 / 62).

#### 4.4. Operation of the gear box

The ROTAX 125 MAX DD2 evo is fitted with a 2-speed gearbox that is changed manually via a shifting device. The engine also has an electronic ignition cut-off which, when changing from 1<sup>st</sup> to 2<sup>nd</sup> gear, interrupts the ignition, relieving the load from the gearbox and thereby makes gear shifting easier and faster.

- ◆ **Note:** Gear shifting might not be possible when the engine is not running as it is not assured that the gear engages and the shifting mechanism could get damaged.

In principle, the gear shifting is very simple, only some points have to be observed:

##### Engagement of the 1<sup>st</sup> gear

Only possible in idle mode (engine speeds below 2.500 rpm) as at higher rpm the centrifugal clutch is already engaged.

- ◆ **Note:** Due to the design of the gearbox, it might happen that no gear engages when shifting in idle mode. In such cases briefly increase the speed over 2.500 rpm and try again to engage 1<sup>st</sup> gear.

##### Shifting from 1<sup>st</sup> to 2<sup>nd</sup> gear

- ➔ In principle, this is possible at any engine speed (rpm). The optimum timing for shifting is at about 12.200 1/min.

- ➔ Due to the electronic ignition cut-off, the gas pedal can stay fully activated during the shifting operation.

### Shifting from 2<sup>nd</sup> to 1<sup>st</sup> gear

- ➔ Due to the high difference in rpm between the two gears, it is prohibited to shift down at a speed of over 10.200 rpm.

## 4.5. Adjustment of gear shifting

The perfect functioning of gear shifting depends to a great extent on the correct adjustment of the gear shifting mechanism.

- ◆ **Note:** When the engine is not running, it may not be possible to engage gears, depending on the position between shifting sleeve and idle gear of the first or second gear. In this case, turn the rear axle until you find a position allowing gears to engage.
- ➔ Check, whether the shift paddle aligns with the steering wheel when in „NEUTRAL“. If this is not the case, correct the Bowden cable accordingly.
- ◆ **Note:** For adjustment of gear shifting, please follow the instruction of the chassis manufacturer.
- ◆ **Note:** If the gearshift cables are excessively tensioned, the gears are hard to shift.
- ➔ The distance between shift contact and screw head at the gearshift shaft must be 1,0 – 1,5 mm / 0.04 – 0.06 in. The distance can be adjusted by turning the Allen screw (pos.1) in or out.
- ◆ **Note:** If the distance between shift contact and screw head is not correctly adjusted, the function of the ignition cut-off is not assured. This may cause gear shifting problems.
- ◆ **Note:** If changing the gear becomes difficult after some operating hours, check, whether the retaining plate is bent, replace it with a new one or try to bend the support back into the correct position.

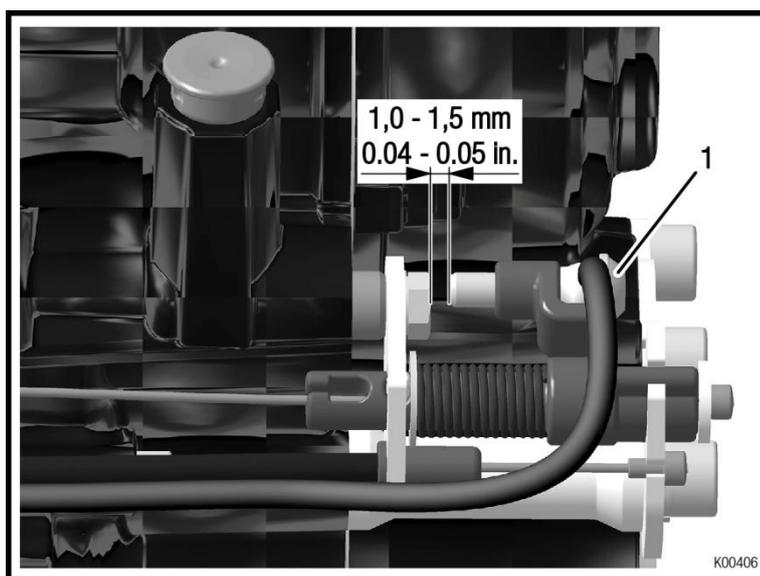


Fig. 5

## 5. Operating limits

min. coolant temperature	35 °C / 95 °F
max. coolant temperature	85 °C / 185 °F

▲ **Warning:** The engine is only allowed to be run at peak performance after reaching the specified operating temperature. Operating the engine at a too low temperature could result in piston seizure.

◆ **Note:** If the engine does not reach the minimum specified operating temperature due to the low ambient temperature, the cooling efficiency of the radiator must be reduced by partially covering the radiator with adhesive tape.

▲ **Warning:** The maximum operating temperature of the engine must not be exceeded. If the temperature is too high, it may result in piston seizure.

◆ **Note:** Dirt must be cleared from the lamination of the radiator at regular intervals to achieve the best cooling performance.

## 6. Engine start and operation

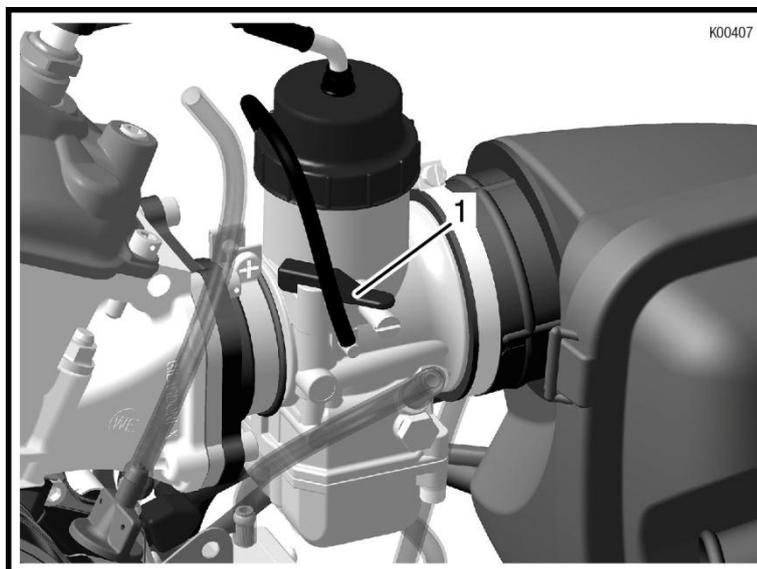
### 6.1. Engine start

Prior to engine start, verify the following:

- ✓ Fuel tank full.
- ✓ Battery charged and connected.
- ✓ Battery voltage over 12V.
- ✓ Carburetor Bowden cable is moving freely and carburetor piston connected in idle position.
- ✓ Shifting device in "**Neutral**" (no gear engaged).

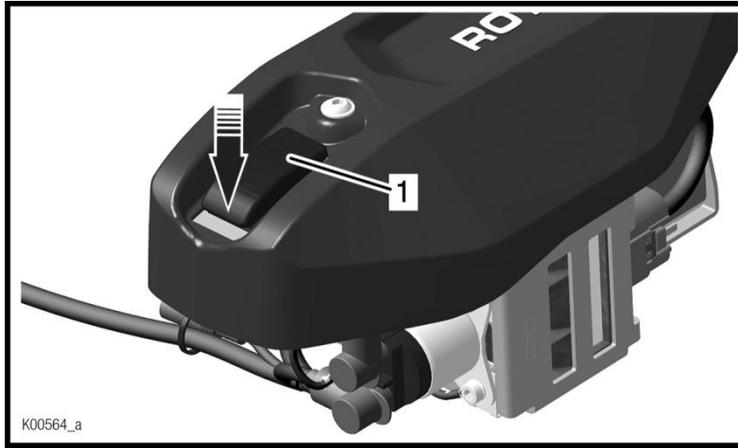
At engine start proceed as follows:

- ➔ On a cold engine, pull the choke lever (pos. 1, *Fig. 6*) into a vertical position.



*Fig. 6*

- ➔ Press the power button once, the electric starter is activated (light turns on). Press the button again until the engine starts (*Fig. 7*).
- ◆ **Note:** If the engine does not start, repeat the operation after a few seconds in the same manner.
- ➔ After engine start, take choke back slowly until engine idles smoothly without choke.



*Fig. 7*

- ▲ **Warning:** Always wear protective clothing for kart operation (helmet, overall, gloves, shoes, neck and rib guards).
- ▲ **Warning:** Do not touch the engine, the radiator or the exhaust system during and immediately after kart operation. Risk of burning.
- ▲ **Warning:** During kart operation, beware of body or clothing contact with moving components of the kart.
- ▲ **Warning:** Comply with the safety advice of the kart manufacturer.
- ▲ **Warning:** Inspect any part prone to wear (tyres, bearings etc.) before each kart event for good condition in accordance with the directives of the kart manufacturer.
- ▲ **Warning:** Keep to running-in procedure as directed.
- ▲ **Warning:** Operate engine only within the specified limits.
- ▲ **Warning:** Never run the fuel tank empty.
- ▲ **Warning:** Only get in and out of the kart when engine is not running.

---

## 6.2. Stopping the engine

See *Fig. 8*.

- ➔ Press the power button and the engine will stop. Press the button once again to deactivate the electric starter (light turns off).
- **Attention: Danger of corrosion!** After riding in the rain, the RAVE control unit must be checked for moisture. For this purpose, dismantle the black hose from the RAVE control unit and check if there is moisture in the system.

- ◆ **Note:** If the electric starter is activated, the ignition system will consume current. This can cause a deep discharge and damage to the battery.

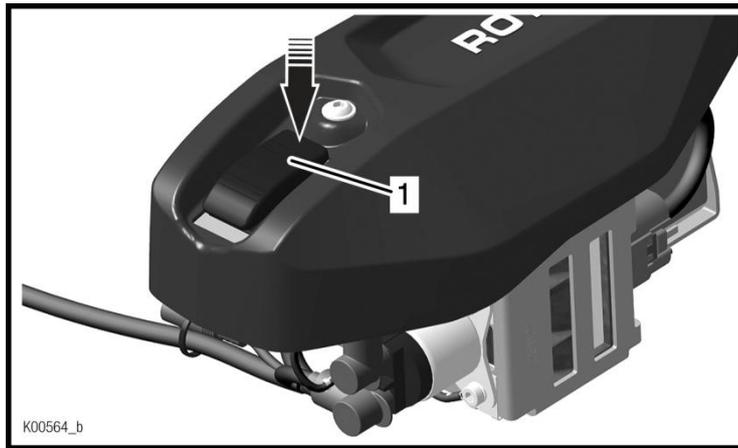


Fig. 8

### 6.3. Running-in procedure for the engine

- **Attention:** Pay attention to safety advice of the kart manufacturer.

To ensure that components have the longest possible lifespan, the engine must undergo a defined running-in period at first operation or after a repair of the crankshaft or displacement parts.

- ◆ **Note:** Cover the radiator with the mounted windshield to reach the operating temperature earlier.

Observe the following issues:

- ✓ Use a long gear ratio (standard or higher).
- ✓ Use two sizes bigger main jet size based on altitude and temperature (see section 4.1.)
- ✓ For the first 10 liters of fuel use a mixing ratio of 1:33 (= 3% or 0.3 liter oil per 10 liters fuel).
- ✓ Make sure that the coolant temperature reaches 35 °C (95 °F).
- ✓ Run the kart for 15 minutes at continuously changing load and engine speed fluctuation up to maximum rotational speed. Rotational speed for max. 2 seconds!
- ✓ Afterwards reduce the main jet size step by step until standard size is reached.

After this running-in procedure, the full power of the engine may be used.

- **Attention:** Use only **fully synthetic** two-stroke oil. BRP-Rotax recommends the use of XPS Kart-Tec oil.

- **Attention:** The engine may never be operated without load. If it operated without load (i.e. on the trolley), rpm over 13.800 1/min are possible, which shortens the lifetime of components (conrod, big end bearing etc.).

#### 6.4. Setting of the exhaust valve timing

The opening time of the exhaust valve is set in the ECU and depends on the engine speed. However, the ECU allows two different modes of the exhaust valve opening. These can be selected by connecting an additional cable to the cylinder head cover.

■ **Attention:** The ground wire (pos. 1) must be continuously connected. This is important for the general function of the engine.

##### Variant 1: Additional cable on battery ground

**A:**

See Fig. 9.

The additional cable is **NOT** attached to the ground wire. The control of the exhaust valve timing is activated at 9100 rpm.

◆ **Note:** Isolate the additional cable with an electrical/insulating tape to the ground wire so that a possible contact with the engine ground does not affect the function.

**B:**

See Fig. 9.

The additional cable is attached to the ground wire. The control of the exhaust valve timing is activated at 8800 rpm.

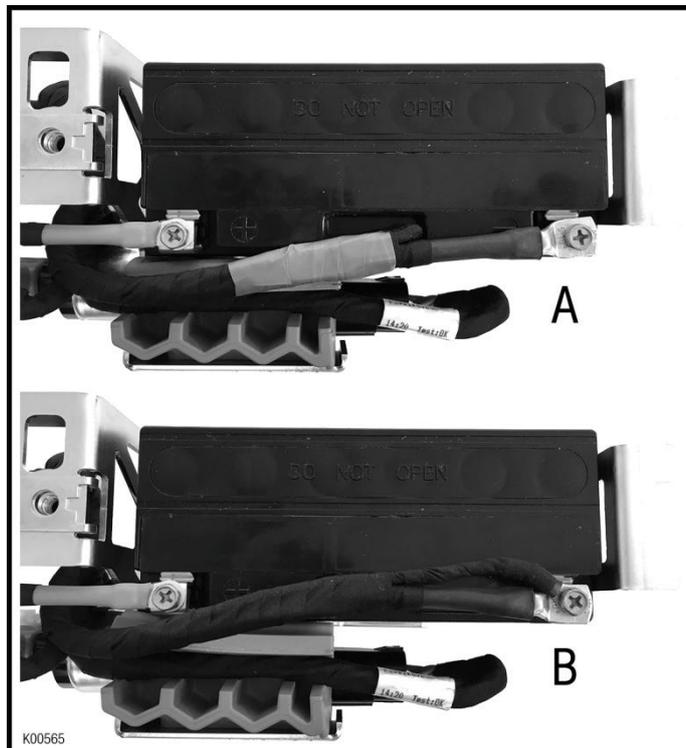


Fig. 9

**Variant 2: Additional cable on starter relay**

**A:**

See Fig. 10.

The additional cable is **NOT** attached to the ground wire. The control of the exhaust valve timing is activated at 9100 rpm.

◆ **Note:** Isolate the additional cable with an electrical/insulating tape to the ground wire so that a possible contact with the engine ground does not affect the function.

**B:**

See Fig. 10.

The additional cable is attached to the ground wire. The control of the exhaust valve timing is activated at 8800 rpm.

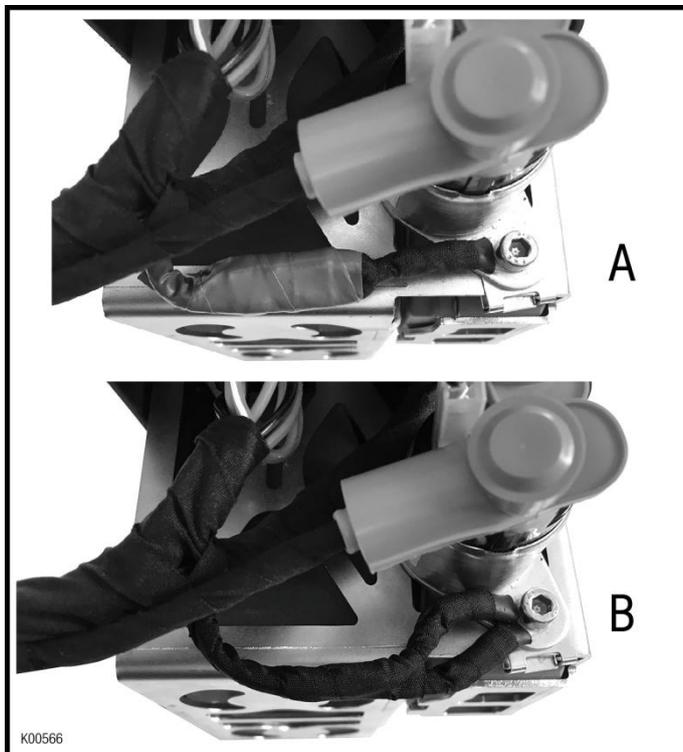


Fig. 10

◆ **Note:** Either variant 1 or variant 2 has been installed in your engine.

**6.5. Maintenance schedule for engine components**

**▲ Warning: Non-compliance with the specified maintenance schedule could result in engine damage.**

	FREQUENCY						NOTES
	BEFORE EVERY OPERATION	AFTER EVERY OPERATION	EVERY 2 HOURS OF OPERATION	EVERY 5 HOURS OF OPERATION	EVERY 10 HOURS OF OPERATION	EVERY 50 HOURS OF OPERATION	
<b>ENGINE</b>							
Check oil level in gearbox			X				
Exchange oil in gearbox							after first 5 hours of operation, then after every 5 hours of operation
Clean exhaust valve and check if moving freely				X			
Check overflow bottle, empty if needed	X						
Tear-down inspection of engine (must be conducted by an authorized ROTAX Service Center)						X	Inspect following components and replace if requested: piston, piston pin and piston pin bearing, conrod and conrod bearing, main bearings of crankshaft.
Clean airfilter, apply oil, replace in case of visible damage				X			after each rainy session, use air filter cleaner kit
Visually inspect connections between engine and carburetor and check fit and tightness of intake silencer	X						right after every collision
Visually inspect fuel filter regarding dirt, replace if needed	X						
Replace fuel filter						X	
Renew damping material in after muffler of exhaust system				X			
Check fit and tightness of exhaust	X						
Inspect for oil or water on the leakage bore at the crankcase	X						right after every collision
Verify a tight fit and non leakage of radiator hoses and clamps at engine and radiator	X						right after every collision
Replace spark plug						X	as requested
Dirt catching groove on secondary gear					X		
Overload clutch inspection	X						

## 7. Transport of the kart

If the carburetor is still filled with fuel, the kart is only allowed to be transported in a horizontal position.

If the kart is to be transported in a vertical position, the fuel must be drained from the carburetor first.

- ◆ **Note:** If the kart is in a vertical position during transport, the remaining fuel in the carburetor might flow into the crankcase with the result that the engine will not start at next try.
- ➔ Remove drain screw (pos. 27, Fig. 2) on float chamber of carburetor and collect the fuel in a suitable container.
- ➔ Clean drain screw and refit.

---

## 8. Preservation of engine and equipment

For longer periods out of operation (winter time), make sure that the engine will be properly preserved.

- ➔ Detach carburetor, drain fuel from carburetor and close carburetor openings to ensure that no dust or dirt can enter.
  - ➔ If the vehicle is stored at temperatures below freezing, the cooling system must be filled with a mixture of distilled water and an aluminium-compatible antifreeze. The mixture must ensure protection against freezing up to a temperature of  $-20\text{ }^{\circ}\text{C}$  /  $-4\text{ }^{\circ}\text{F}$ . Or drain the entire cooling system and clean the cooling circuit with air pressure.
- ▲ **Warning:** **Not following this will lead to engine damage (e.g. breakage of cylinder).**
- ➔ Close intake and exhaust port of engine with adhesive tape so that they are airtight.
  - ➔ Apply oil on exhaust system to prevent corrosion.
  - ➔ Remove battery from the fixture and charge periodically with the specified battery charger.





**IMPORTANT INFORMATION (SUMMARY)**

IMPORTANT INFORMATION	LITER	GAL.	SPECIFICATION	RECOMMENDED BRANDS
FUEL			Unleaded fuel of minimum octane level of 95 ROZ resp. 91 MOZ	
2-STROKE OIL			Fully synthetic	XPS Kart-Tec
OIL IN FUEL MIXING RATIO			During break-in: 1:33 (= 3% oil) During normal use: 1:50 (= 2% oil)	
COOLING SYSTEM	0,90	0.237	Pure water resp. antifreeze if kart is stored at temperatures below 0°C / 32°F	
GEARBOX OIL	0,150	0.039	Engine oil SAE 15W-40	XPS Kart-Tec
SPARK PLUG			see IPC	NGK

**ROTAX**<sup>®</sup>  
KARTING

